Sun SPARC Enterprise® T5120 and T5220 Servers Service Manual

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Preface

This service manual is for experienced system engineers with training in servicing Sun SPARC® Enterprise T5120 and T5220 servers. The manual contains detailed instructions for troubleshoooting, repairing, and upgrading server components. To use the information in this document, you must have experience working with advanced server technology.

UNIX Commands

This document might not contain information on basic UNIX commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at

  (http://docs.sun.com)

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

The documents listed as online are available at:

(http://docs.sun.com/app/docs/prod/sparc.t5120)

(http://docs.sun.com/app/docs/prod/sparc.t5220)

Application	Title	Part Number	Format	Location
Product Notes	*Sun SPARC Enterprise T5120 and T5220 Servers Product Notes*	820-2176	PDF	Online
Getting Started	*Sun SPARC Enterprise T5120 Server Getting Started Guide*	820-4417	Printed	Ships with system
Getting Started	*Sun SPARC Enterprise T5120 Server Getting Started Guide (DC)*	820-5838	Printed	Ships with system
Overview	*Sun SPARC Enterprise T5120 and T5220 Servers Overview Guide*	820-2183	PDF HTML	Online
Planning	*Sun SPARC Enterprise T5120 and T5220 Servers Site Planning Guide*	820-2177	PDF HTML	Online
Installation	*Sun SPARC Enterprise T5120 and T5220 Servers Installation Guide*	820-2178	PDF HTML	Online
Administration	*Sun SPARC Enterprise T5120 and T5220 Servers Administration Guide*	820-2179	PDF HTML	Online

Application	Title	Part Number	Format	Location
Service	*Sun SPARC Enterprise T5120 and T5220 Servers Service Manual*	820-2181	PDF HTML	Online
Safety	*Sun SPARC Enterprise T5120 and T5220 Servers Safety and Compliance Manual*	820-2182	PDF	Online
Remote Management	*Sun Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun SPARC Enterprise T5120 and T5220 Servers*	820-6683	PDF HTML	Online

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Sun SPARC Enterprise T5120 and T5220 Servers Service Manual, part number 820-2181-13.

Identifying Server Components

These topics identify key components of the Sun SPARC Enterprise T5120 and T5220 servers, including major boards and internal system cables, as well as front and rear panel features.

- "Infrastructure Boards in Sun SPARC Enterprise T5120 Servers" on page 2
- "Infrastructure Boards in Sun SPARC Enterprise T5220 Servers" on page 3
- "Internal System Cables for Sun SPARC Enterprise T5120 Servers" on page 4
- "Internal System Cables for Sun SPARC Enterprise T5220 Servers" on page 5
- "Front Panel Controls and Indicators on Sun SPARC Enterprise T5120 Servers" on page 5
- "Rear Panel Components and Indicators on Sun SPARC Enterprise T5120 Servers" on page 8
- "Front Panel Controls and Indicators on Sun SPARC Enterprise T5220 Servers" on page 9
- "Rear Panel Components and Indicators on Sun SPARC Enterprise T5220 Servers" on page 12
- "Status LEDs for Ethernet Ports and Network Management Port" on page 14

Related Information

- "Identifying FRUs in SPARC Enterprise T5120 Servers" on page 181
- "Identifying FRUs in Sun SPARC Enterprise T5220 Servers" on page 195

Infrastructure Boards in Sun SPARC Enterprise T5120 Servers

Sun SPARC Enterprise T5120 servers are based on a 1U chassis family. The following table provides a summary of the circuit boards used in these servers.

Board	Description
Motherboard	This board includes two CMP modules, slots for 16 FB-DIMM, memory control subsystems, and all service processor (ILOM) logic. It also hosts a removable SCC module, which contains all MAC addresses, host ID, and ILOM configuration data.
Power distribution board	This board distributes main 12V power from the power supplies to the rest of the system. This board is directly connected to the paddle card, and to the motherboard via a bus bar and ribbon cable. This board also supports a top cover safety interlock (“kill”) switch.
Paddle card	This board serves as the interconnect between the power distribution board and the fan power boards, disk drive backplane, and front I/O board.
Fan power boards (2)	These boards carry power to the system fan modules. In addition, these boards contain fan module status LEDs and transmit status and control data for the fan modules.
Hard drive backplane	This board includes the connectors for the hard drives. This board also contains the interconnect for the front I/O board, Power and Locator buttons, and system/component status LEDs. Each drive has its own Power/Activity, Fault, and Ready-to-Remove LEDs.
Front I/O board	This board connects directly to the hard drive backplane. This board is packaged with the DVD drive as a single unit.

Related Information

- “Infrastructure Boards in Sun SPARC Enterprise T5220 Servers” on page 3

- "Identifying FRUs in SPARC Enterprise T5120 Servers" on page 181
- "Identifying FRUs in Sun SPARC Enterprise T5220 Servers" on page 195

Infrastructure Boards in Sun SPARC Enterprise T5220 Servers

Sun SPARC Enterprise T5220 servers are based on a 2U chassis family. The following table provides a summary of the circuit boards used in these servers.

Board	Description
Motherboard	This board includes two CMP modules, slots for 16 FB-DIMM, memory control subsystems, and all service processor (ILOM) logic. It also hosts a removable SCC module, which contains all MAC addresses, host ID, and ILOM configuration data.
Power distribution board	This board distributes main 12V power from the power supplies to the rest of the system. This board is directly connected to the paddle card, and to the motherboard via a bus bar and ribbon cable. This board also supports a top cover safety interlock ("kill") switch.
Power supply backplane (Sun SPARC Enterprise T5220 Servers only)	This board carries 12V power from the power supplies to the power distribution board over a pair of bus bars. In Sun SPARC Enterprise T5120 servers, the power supplies connect directly to the power distribution board.
Paddle card	This board serves as the interconnect between the power distribution board and the fan power boards, disk drive backplane, and front I/O board.
Fan power boards (2)	These boards carry power to the system fan modules. In addition, these boards contain fan module status LEDs and transmit status and control data for the fan modules.

Board	Description
Hard drive backplane	This board includes the connectors for the hard drives. This board also contains the interconnect for the front I/O board, Power and Locator buttons, and system/component status LEDs. Each drive has its own Power/Activity, Fault, and Ready-to-Remove LEDs.
Front I/O board	This board connects directly to the hard drive backplane. This board is packaged with the DVD drive as a single unit.

Related Information

- "Infrastructure Boards in Sun SPARC Enterprise T5120 Servers" on page 2
- "Identifying FRUs in SPARC Enterprise T5120 Servers" on page 181
- "Identifying FRUs in Sun SPARC Enterprise T5220 Servers" on page 195

Internal System Cables for Sun SPARC Enterprise T5120 Servers

The following table identifies the internal system cables used in Sun SPARC Enterprise T5120 servers.

Cable	Description
Top cover interlock cable	This cable connects the safety interlock switch on the top cover to the power distribution board.
Ribbon cable	This cable carries signals between the power distribution board and the motherboard.
Hard drive data cable	This cable carries data and control signals between the motherboard and the hard drive backplane.

Related Information

- "Identifying FRUs in SPARC Enterprise T5120 Servers" on page 181

Internal System Cables for Sun SPARC Enterprise T5220 Servers

The following table identifies the internal system cables used in Sun SPARC Enterprise T5220 servers.

Cable	Description
Top cover interlock cable	This cable connects the safety interlock switch on the top cover to the power distribution board.
Ribbon cable	This cable carries signals between the power supply backplane and the power distribution board.
Ribbon cable	This cable carries signals between the power distribution board and the motherboard.
Hard drive data cables (1 or 2, depending on hard drive backplane)	This cable carries data and control signals between the motherboard and the hard drive backplane.

Related Information

- "Identifying FRUs in Sun SPARC Enterprise T5220 Servers" on page 195

Front Panel Controls and Indicators on Sun SPARC Enterprise T5120 Servers

The following figure shows the layout of the T5120 server front panel, including the power and system locator buttons and the various status and fault LEDs.

Note – The front panel also provides access to internal hard drives, the removable media drive, and the two front USB ports.

FIGURE: Front Panel Controls and Indicators on Sun SPARC Enterprise T5120 Servers

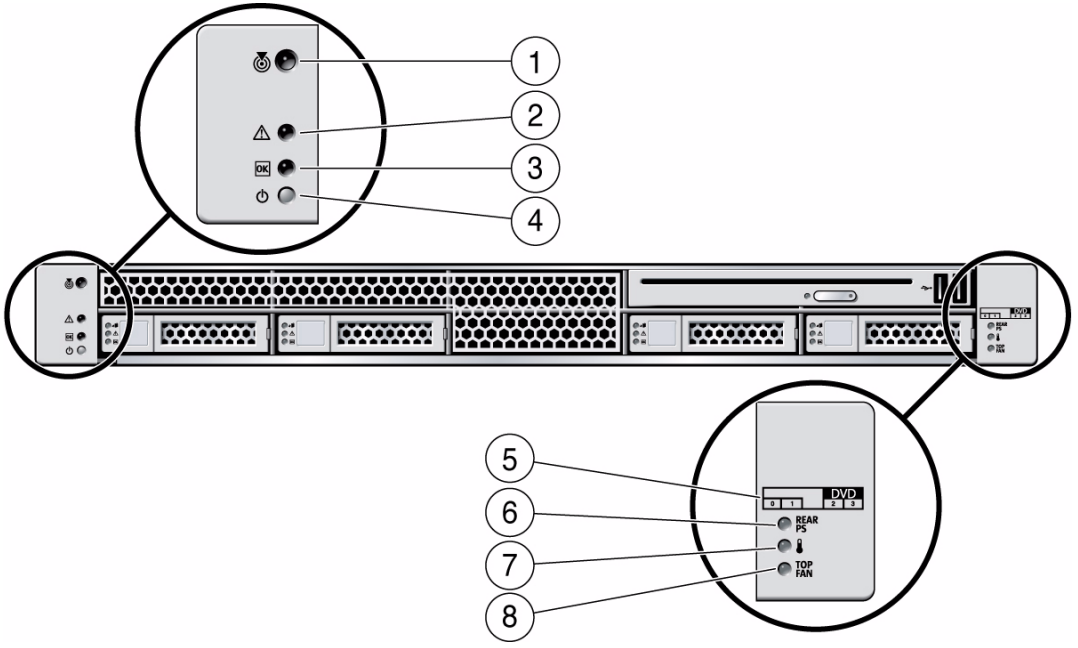


Figure Legend

1	Locator LED and button	**5**	Hard Drive map
2	Service Required LED	**6**	Power Supply Service Required LED
3	Power OK LED	**7**	Overtemp LED
4	Power button	**8**	Fan Module Service Required LED

The following table provides descriptions of these controls and indicators.

TABLE: Front Panel Controls and Indicators (Sun SPARC Enterprise T5120 and T5220 Servers)

LED or Button	Icon or Label	Description
Locator LED and button (white)		The Locator LED can be turned on to identify a particular system. When on, it blinks rabidly. There are three methods for turning a Locator LED on: • Issuing the ILOM command `set /SYS/LOCATE value=Fast_Blink` • Issuing the ALOM CMT command `setlocator on`. • Pressing the Locator button.
Service Required LED (amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – System is not running in its normal state. System power might be off. The service processor might be running. • Steady on – System is powered on and is running in its normal operating state. No service actions are required. • Fast blink – System is running in standby mode and can be quickly returned to full function. • Slow blink –A normal, but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running, or the system is booting.
Power button		The recessed Power button toggles the system on or off. • Press once to turn the system on. • Press once to shut the system down in a normal manner. • Press and hold for 4 seconds to perform an emergency shutdown.
Power Supply Fault LED (amber)	REAR PS	Provides the following operational PSU indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a power supply failure event has been acknowledged and a service action is required on at least one PSU.
Overtemp LED (amber)		Provides the following operational temperature indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a temperature failure event has been acknowledged and a service action is required.
Fan Fault LED (amber)	TOP FAN	Provides the following operational fan indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a fan failure event has been acknowledged and a service action is required on at least one of the fan modules.

Related Information

- "LED Overview" on page 21

Rear Panel Components and Indicators on Sun SPARC Enterprise T5120 Servers

The following figure shows the layout of the connectors associated with the system I/O ports, PCIe ports, 10 Gbit Ethernet (XAUI) ports (if equipped) and power supplies on the rear panel of Sun SPARC Enterprise T5120 servers. It also shows the locations of the rear panel LEDs.

FIGURE: Rear Panel Components and Indicators on Sun SPARC Enterprise T5120 Serves

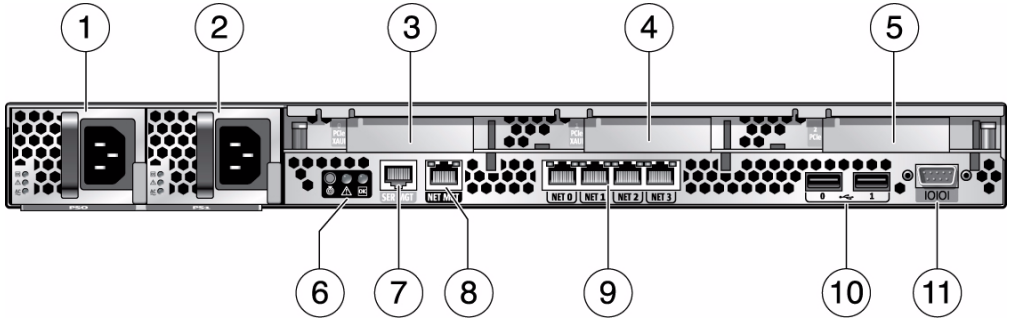


Figure Legend

1	PSU 0	**7**	Serial management port
2	PSU 1	**8**	Network management port
3	PCIe/XAUI 0	**9**	Gigabit Ethernet ports (0, 1, 2, 3)
4	PCIe/XAUI 1	**10**	USB ports (0, 1))
5	PCIe 2	**11**	DB-9 serial port
6	Rear panel system status LEDs		

The following table provides descriptions of the LEDs located on the rear panel.

TABLE: Rear Panel LED Indicators (Sun SPARC Enterprise T5120 and T5220 Servers)

LED or Button	Icon or Label	Description
Locator LED and button (white)		The Locator LED can be turned on to identify a particular system. When on, it blinks rabidly. There are three methods for turning a Locator LED on: • Issuing the ILOM command `set /SYS/LOCATE value=Fast_Blink` • Issuing the ALOM CMT command `setlocator on`. • Pressing the Locator button.
Service Required LED (amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – System is not running in its normal state. System power might be off. The service processor might be running. • Steady on – System is powered on and is running in its normal operating state. No service actions are required. • Fast blink – System is running in standby mode and can be quickly returned to full function. • Slow blink –A normal, but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running, or the system is booting.

Related Information

- "LED Overview" on page 21

Front Panel Controls and Indicators on Sun SPARC Enterprise T5220 Servers

The following figure shows the layout of the T5120 server front panel, including the power and system locator buttons and the various status and fault LEDs.

Note – The front panel also provides access to internal hard drives, the removable media drive (if equipped), and the two front USB ports.

FIGURE: Front Panel Controls and Indicators on Sun SPARC Enterprise T5220 Servers

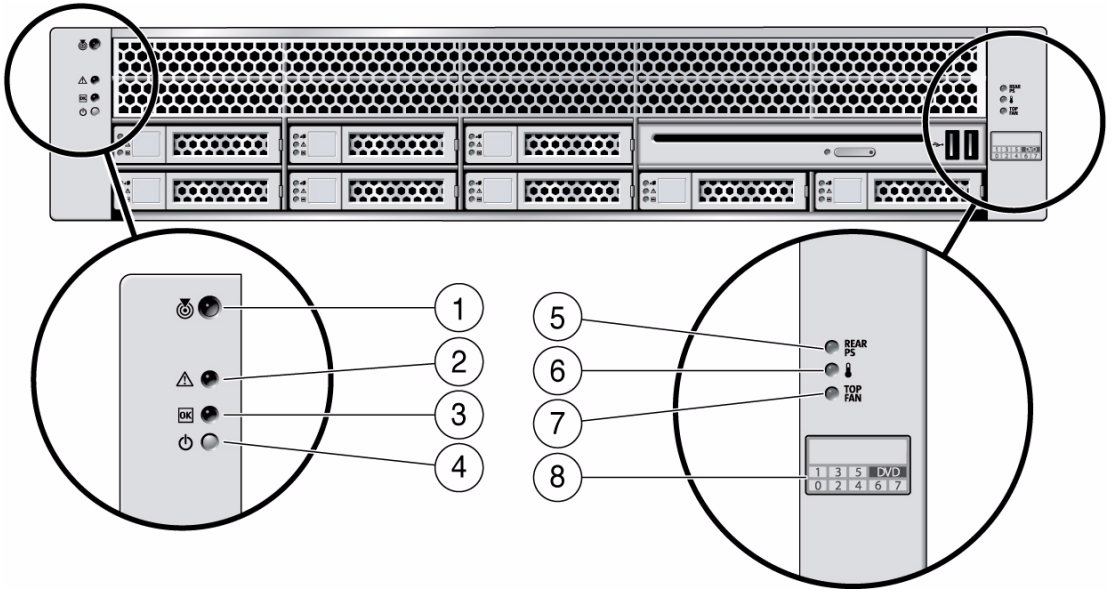


Figure Legend

1	Locator LED and button	**5**	Power Supply Service Required LED
2	Service Required LED	**6**	Overtemp LED
3	Power OK LED	**7**	Fan Module Service Required LED
4	Power button	**8**	Hard Drive map

The following table provides descriptions of these controls and indicators.

TABLE: Front Panel Controls and Indicators (Sun SPARC Enterprise T5120 and T5220 Servers)

LED or Button	Icon or Label	Description
Locator LED and button (white)		The Locator LED can be turned on to identify a particular system. When on, it blinks rabidly. There are three methods for turning a Locator LED on: • Issuing the ILOM command `set /SYS/LOCATE value=Fast_Blink` • Issuing the ALOM CMT command `setlocator on`. • Pressing the Locator button.
Service Required LED (amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – System is not running in its normal state. System power might be off. The service processor might be running. • Steady on – System is powered on and is running in its normal operating state. No service actions are required. • Fast blink – System is running in standby mode and can be quickly returned to full function. • Slow blink –A normal, but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running, or the system is booting.
Power button		The recessed Power button toggles the system on or off. • Press once to turn the system on. • Press once to shut the system down in a normal manner. • Press and hold for 4 seconds to perform an emergency shutdown.
Power Supply Fault LED (amber)	REAR PS	Provides the following operational PSU indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a power supply failure event has been acknowledged and a service action is required on at least one PSU.
Overtemp LED (amber)		Provides the following operational temperature indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a temperature failure event has been acknowledged and a service action is required.
Fan Fault LED (amber)	TOP FAN	Provides the following operational fan indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a fan failure event has been acknowledged and a service action is required on at least one of the fan modules.

Related Information

- "LED Overview" on page 21

Rear Panel Components and Indicators on Sun SPARC Enterprise T5220 Servers

The following figure shows the layout of the I/O ports, PCIe ports, 10 Gbit Ethernet (XAUI) ports (if equipped) and power supplies on the rear panel.

FIGURE: Rear Panel Components and Indicators on Sun SPARC Enterprise T5220 Servers

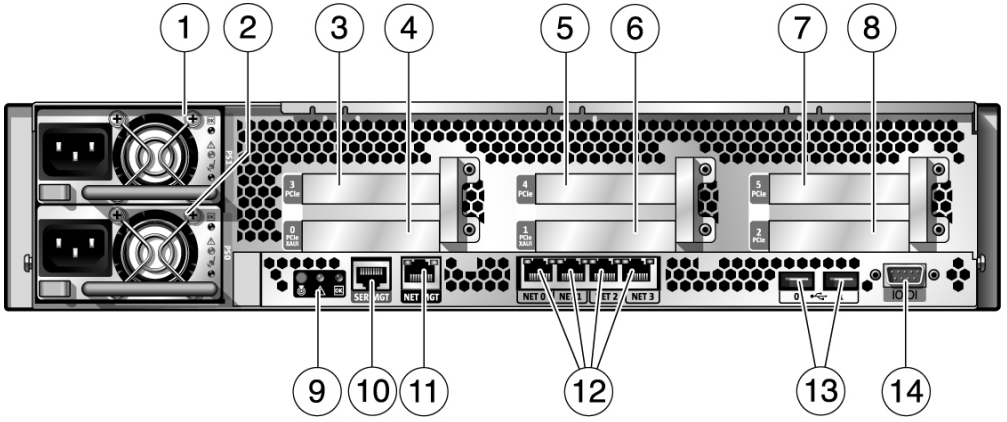


Figure Legend

1	PSU 1	**8**	PCIe 2
2	PSU 0	**9**	Rear panel status LEDs
3	PCIe 3	**10**	Serial management port
4	PCIe/XAUI 0	**11**	Network management port
5	PCIe 4	**12**	Gigabit Ethernet ports (0, 1, 2, 3)
6	PCIe/XAUI 1	**13**	USB ports (0, 1)
7	PCIe 5	**14**	DB-9 serial port

The following table provides descriptions of the LEDs located on the rear panel.

TABLE: LED Indicators on the Sun SPARC Enterprise T5220 Server Rear Panel

LED or Button	Icon or Label	Description
Locator LED and button (white)		The Locator LED can be turned on to identify a particular system. When on, it blinks rabidly. There are three methods for turning a Locator LED on: • Issuing the ILOM command `set /SYS/LOCATE value=Fast_Blink` • Issuing the ALOM CMT command `setlocator on`. • Pressing the Locator button.
Service Required LED (amber)		If on, indicates that service is required. POST and ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – System is not running in its normal state. System power might be off. The service processor might be running. • Steady on – System is powered on and is running in its normal operating state. No service actions are required. • Fast blink – System is running in standby mode and can be quickly returned to full function. • Slow blink –A normal, but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running, or the system is booting.

Related Information

- "LED Overview" on page 21

Status LEDs for Ethernet Ports and Network Management Port

The following table describes the status LEDs assigned to each Ethernet port.

TABLE: Ethernet Port LEDs (NET0, NET1, NET2, NET3)

LED	Color	Description
Left LED	Amber or Green	Speed indicator: • Amber on – The link is operating as a Gigabit connection (1000 Mbps). • Green on – The link is operating as a 100-Mbps connection. • Off – The link is operating as a 10-Mbps connection.
Right LED	Green	Link/Activity indicator: • Blinking – A link is established. • Off – No link is established.

The following table describes the status LEDs assigned to the Network Managment port.

TABLE: Network Management Port LEDs (NET MGT)

LED	Color	Description
Left LED	Green	Link/Activity indicator: • On or blinking – A link is established. • Off – No link is established.
Right LED	Green	Speed indicator: • On or blinking – The link is operating as a 100-Mbps connection. • Off – The link is operating as a 10-Mbps connection..

Related Information

- "LED Overview" on page 21

Detecting and Managing Faults

These topics explain how to use various diagnostic tools to monitor server status and troubleshoot faults in the server.

- "Diagnostic Tools Overview" on page 15
- "Detecting Faults With ILOM" on page 22
- "Detecting Faults With POST" on page 34
- "Managing POST Operations" on page 35
- "Managing Faults Using the PSH Feature" on page 43
- "Viewing Solaris OS Messages" on page 48
- "Managing Components With Automatic System Recovery Commands" on page 50
- "Detecting Faults Using SunVTS Software" on page 53

Related Information

- "Identifying FRUs in SPARC Enterprise T5120 Servers" on page 181
- "Identifying FRUs in Sun SPARC Enterprise T5220 Servers" on page 195

Diagnostic Tools Overview

The service processor provides a range of system management and diagnostic tools that enable you to monitor server operations and troubleshoot server problems. The following is a high-level summary of the various diagnostic tools that are available on the server:

- **LEDs** – Status indicators are provided on the server's front and rear panels as well as on some FRUs.
- **ILOM** – The Integrated Lights Out Manager (ILOM) firmware runs on the service processor and is the central software resource for identifying and managing problems in the server.

- **Power-on self-test (POST)** – POST performs diagnostics on system components whenever the system is turned on or a system reset is issued.
- **Solaris OS Predictive Self-Healing (PSH)** – PSH continuously monitors the health of the processor and memory, collecting data that can be used to predict component failures before they occur. PSH works with ILOM to take a component offline if data indicate there is a high risk it will fail.
- **Solaris OS log files and command interface** – The Solaris OS reports operational and error information to its standard log files. It also provides various commands for investigating system status.
- **SunVTS** – This is an application that exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

The LEDs, ILOM, PSH, and many of the log files and console messages are integrated. For example, when the Solaris software detects a fault, it displays the fault, logs it, and passes information to ILOM where it is logged. Depending on the fault, one or more LEDs might also be illuminated.

Service Processor Interfaces

There are three methods of interacting with the service processor:

- ILOM shell (default)
- ILOM browser interface (BI)
- ALOM CMT compatibility shell

The ILOM shell provides access to ILOM's features and functions through a command-line interface (CLI). The shell prompt looks like this:

```
->
```

The ILOM browser interface supports the same set of features and functions as the shell, but through windows on a browser interface.

The ALOM CMT compatibility shell emulates the ALOM CMT interface used on earlier generations of CMT servers. The ALOM CMT compatibility shell prompt looks like this:

```
sc>
```

Note – Unless indicated otherwise, all examples of interaction with the service processor are depicted with ILOM shell commands.

Multiple service processor accounts can be active concurrently. A user can issue ILOM shell commands while logged in under one account and, at the same time, issue ALOM CMT shell commands while operating in another account.

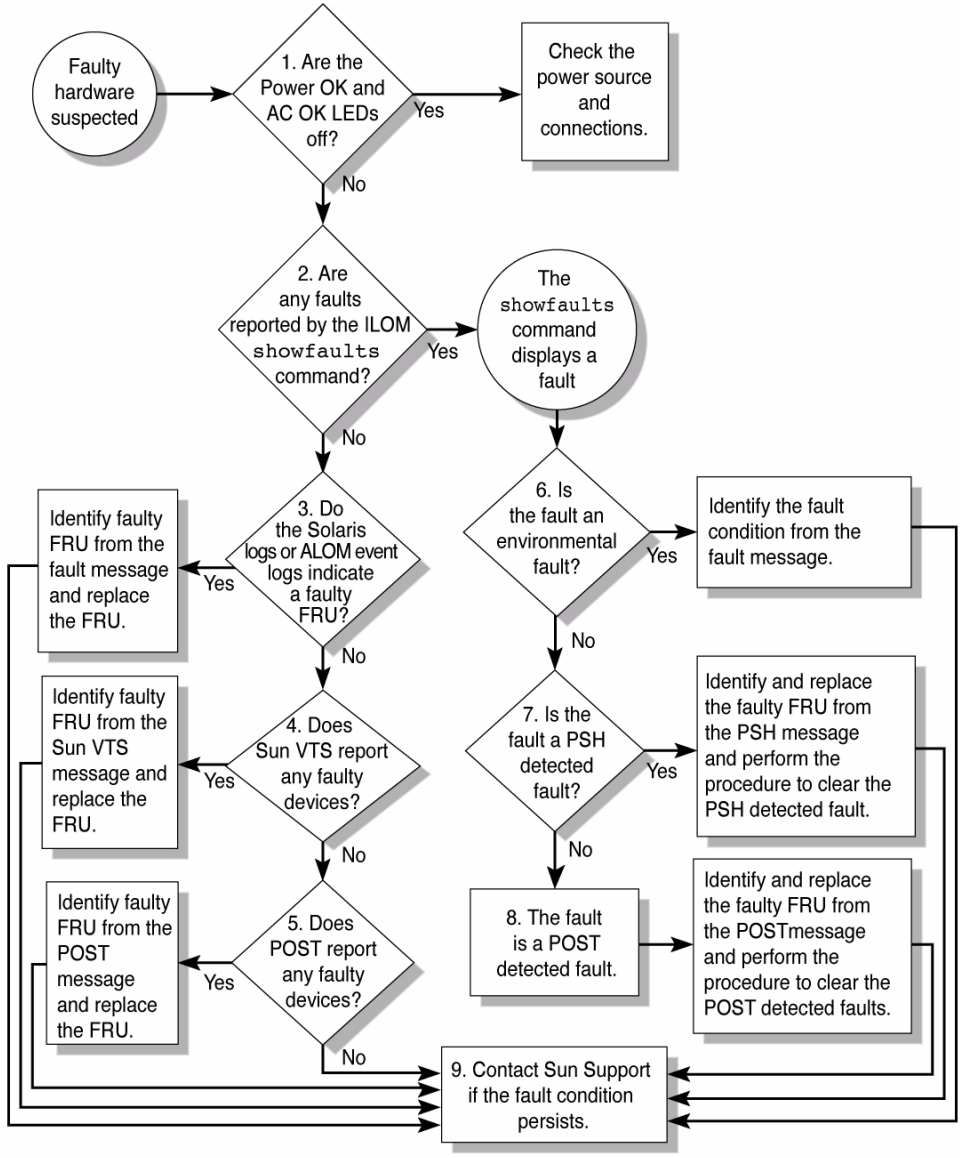
Related Information

- "Diagnostics Tools Quick Reference" on page 17

Diagnostics Tools Quick Reference

The following flowchart illustrates the complementary relationship of the different diagnostic tools and indicates a default sequence of use.

FIGURE: Diagnostics Flowchart


Faulty hardware suspected
1. Are the Power OK and AC OK LEDs off?
Yes
Check the power source and connections.
No
2. Are any faults reported by the ILOM showfaults command?
Yes
The showfaults command displays a fault
No
3. Do the Solaris logs or ALOM event logs indicate a faulty FRU?
Yes
Identify faulty FRU from the fault message and replace the FRU.
No
4. Does Sun VTS report any faulty devices?
Yes
Identify faulty FRU from the Sun VTS message and replace the FRU.
No
5. Does POST report any faulty devices?
Yes
Identify faulty FRU from the POST message and replace the FRU.
No
6. Is the fault an environmental fault?
Yes
Identify the fault condition from the fault message.
No
7. Is the fault a PSH detected fault?
Yes
Identify and replace the faulty FRU from the PSH message and perform the procedure to clear the PSH detected fault.
No
8. The fault is a POST detected fault.
Identify and replace the faulty FRU from the POSTmessage and perform the procedure to clear the POST detected faults.
9. Contact Sun Support if the fault condition persists.

The following table provides brief descriptions of the troubleshooting actions shown in the flowchart. It also provides links to topics with additional information on each diagnostic action.

TABLE: Diagnostic Flowchart Reference Table

Diagnostic Action	Possible Outcome	Additional Information
Check Power OK and AC Present LEDs on the server. (Flowchart item 1)	The Power OK LED is located on the front and rear of the chassis. The AC Present LED is located on the rear of the server on each power supply. If these LEDs are not on, check the power source and power connections to the server.	• "Front Panel Controls and Indicators on Sun SPARC Enterprise T5120 Servers" on page 5 • "Front Panel Controls and Indicators on Sun SPARC Enterprise T5220 Servers" on page 9
Run the ILOM `show faulty` command to check for faults. Flowchart item 2)	The `show faulty` command displays the following kinds of faults: • Environmental faults • Solaris Predictive Self-Healing (PSH) detected faults • POST detected faults Faulty FRUs are identified in fault messages using the FRU name.	• TABLE: Service-Related Commands on page 26 • "Faults Displayed by `show faulty`" on page 29
Check the Solaris log files for fault information. (Flowchart item 3)	The Solaris message buffer and log files record system events, and provide information about faults. • If system messages indicate a faulty device, replace the FRU. • For more diagnostic information, review the SunVTS report. (Flowchart item 4)	• "Viewing Solaris OS Messages" on page 48
Run SunVTS software. (Flowchart item 4)	SunVTS is an application you can run to exercise and diagnose FRUs. To run SunVTS, the server must be running the Solaris OS. • If SunVTS reports a faulty device, replace the FRU. • If SunVTS does not report a faulty device, run POST. (Flowchart item 5)	• "Detecting Faults Using SunVTS Software" on page 53
Run POST. (Flowchart item 5)	POST performs basic tests of the server components and reports faulty FRUs.	• "Detecting Faults With POST" on page 34 • TABLE: ILOM Properties Used to Manage POST Operations on page 36

TABLE: Diagnostic Flowchart Reference Table *(Continued)*

Diagnostic Action	Possible Outcome	Additional Information
Check if the fault is environmental. (Flowchart item 6)	Determine if the fault is an environmental fault or a configuration fault. If the fault listed by the `show faulty` command displays a temperature or voltage fault, then the fault is an environmental fault. Environmental faults can be caused by faulty FRUs (power supply or fan), or by environmental conditions such as when computer room ambient temperature is too high, or the server airflow is blocked. When the environmental condition is corrected, the fault will automatically clear. If the fault indicates that a fan or power supply is bad, you can perform a hot-swap of the FRU. You can also use the fault LEDs on the server to identify the faulty FRU (fans and power supplies).	• "Faults Displayed by `show faulty`" on page 29
Determine if the fault was detected by PSH. (Flowchart item 7)	If the fault displayed included a *uuid* and *sunw-msg-id* property, the fault was detected by the Solaris Predictive Self-Healing software. If the fault is a PSH detected fault, refer to the PSH Knowledge Article web site for additional information. The Knowledge Article for the fault is located at the following link: `(http://www.sun.com/msg/message-ID)` where *message-ID* is the value of the *sunw-msg-id* property displayed by the `show faulty` command. After the FRU is replaced, perform the procedure to clear PSH detected faults.	• "Managing Faults Using the PSH Feature" on page 43 • "Clear PSH-Detected Faults" on page 47
Determine if the fault was detected by POST. (Flowchart item 8)	POST performs basic tests of the server components and reports faulty FRUs. When POST detects a faulty FRU, it logs the fault and if possible, takes the FRU offline. POST detected FRUs display the following text in the fault message: `Forced fail` *reason* In a POST fault message, *reason* is the name of the power-on routine that detected the failure.	• "Detecting Faults With POST" on page 34 • "Clear POST-Detected Faults" on page 41
Contact technical support. (Flowchart item 9)	The majority of hardware faults are detected by the server's diagnostics. In rare cases a problem might require additional troubleshooting. If you are unable to determine the cause of the problem, contact your service representative for support.	

LED Overview

The server provides the following groups of LEDs:

- Front panel system LEDs
- Rear panel system LEDs
- Hard drive LEDs
- Power supply LEDs
- Fan module LEDs
- Rear panel Ethernet port LEDs
- FB-DIMM Locate LEDs

The following table provides quick-reference information about the various LEDs. It also points to more detailed descriptions for each.

TABLE: System Faults and the Corresponding LED States

Component Fault	Fault LEDs Lit	Additional Information
Power supply	• Service Required LED (front and rear panel) • Front panel Power Supply Fault LED • Individual power supply Fault LED	• "Power Supplies Overview" on page 129 • "Remove a Power Supply" on page 131 • "Install a Power Supply" on page 134
Fan module	• Service Required LED (front and rear panel) • Front panel Fan Fault LED • Individual fan module Fault LED • Overtemp LED (if overtemp condition exists)	• "Fan Module Overview" on page 123 • "Remove a Fan Module" on page 125 • "Install a Fan Module" on page 127

TABLE: System Faults and the Corresponding LED States *(Continued) (Continued)*

Component Fault	Fault LEDs Lit	Additional Information
Hard drive	• Service Required LED (front and rear panel) • Individual hard drive Fault LED	See these sections: • "Hard Drive Servicing Overview" on page 69 • "Hard Drive LEDs" on page 70 • "Remove a Hard Drive" on page 71 • "Install a Hard Drive" on page 73
FB-DIMM	• Service Required LED (front and rear panel) • FB-DIMM Fault LED on motherboard (when FB-DIMM Locate button is pressed)	See these sections: • "Servicing the Motherboard Assembly" on page 117 • "Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83 • "Identify Faulty FB-DIMMs Using the FB-DIMM Fault Locator Button" on page 83
Other components	• Service Required LED (front and rear panel)	**Note -** Not all components have an individual component Fault LED. If the Service Required LED is lit, use the `show faulty` command to obtain additional information about the component affected. • "Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83

Detecting Faults With ILOM

These topics explain how to use ILOM, the service processor firmware, to diagnose faults and verify successful repairs.

- "ILOM Troubleshooting Overview" on page 23
- "Service-Related ILOM Command Summary" on page 26

Related Information

- ."POST Overview" on page 35
- "ILOM Properties that Affect POST Behavior" on page 35

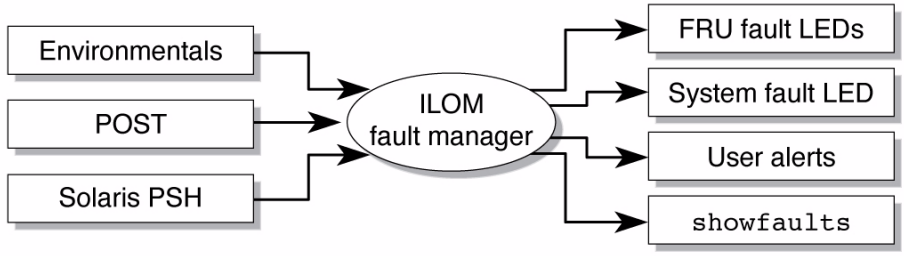
ILOM Troubleshooting Overview

ILOM enables you to remotely run diagnostics such as power-on self-test (POST), that would otherwise require physical proximity to the server's serial port. You can also configure ILOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ILOM.

The service processor runs independently of the server, using the server's standby power. Therefore, ILOM firmware and software continue to function when the server OS goes offline or when the server is powered off.

Faults detected by ILOM, POST, and the Solaris Predictive Self-Healing (PSH) technology are forwarded to ILOM for fault handling.

FIGURE: Fault Reporting Through the ILOM Fault Manager



In the event of a system fault, ILOM ensures that the Service Required LED is turned on, FRUID PROMs are updated, the fault is logged, and alerts are displayed. Faulty FRUs are identified in fault messages using the FRU name.

The service processor can detect when a fault is no longer present. When this happens, it clears the fault state in the FRU PROM and extinguishes the Service Required LED.

A fault condition can be removed in two ways:

- **Unaided recovery** – Faults caused by environmental conditions can clear automatically if the condition responsible for the fault improves over time.
- **Repaired fault** – When a fault is repaired by human intervention, such as a FRU replacement, the service processor will usually detect the repair automatically and extinguish the Service Required LED.

Many environmental faults can automatically recover. For example, a temporary condition may cause the computer room temperature to rise above the maximum threshold, producing an overtemperature fault in the server. If the computer room temperature then returns to the normal range and the server's internal temperature also drops back to an acceptable level, the service processor will detect the new fault-free condition. It will extinguish the Service Required LED and clear the fault state from the FRU PROM.

Note – No ILOM command is needed to manually repair an environmental fault.

The service processor can automatically detect when a FRU is removed. In many cases, it does this even if the FRU is removed while the service processor is not running.

Note – If the service processor does not automatically clear a fault state after the fault is corrected, you must perform these tasks manually. The procedure for clearing faults manually is described in "Clear FRU Faults Manually" on page 31.

Note – ILOM does not automatically detect hard drive replacement.

The Solaris Predictive Self-Healing technology does not monitor hard drives for faults. As a result, the service processor does not recognize hard drive faults and will not light the fault LEDs on either the chassis or the hard drive itself. Use the Solaris message files to view hard drive faults.

For general information about ILOM, see the *Sun Integrated Lights Out Manager (ILOM) 3.0 Concepts Guide*.

For detailed information about ILOM features that are specific to this server, see the *Sun Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun SPARC Enterprise T5120 and T5220 Servers*.

Methods for Connecting to the Service Processor

Before you can run ILOM commands, you must connect to the service processor. You can do this using either of the following methods:

- Connect an ASCII terminal directly to the serial management port.
- Use the `ssh` command to connect to service processor through an Ethernet connection on the network management port.

Note – Refer to the *Sun Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun SPARC Enterprise T5120 and T5220 Servers* for instructions on configuring and connecting to ILOM.

How to Switch From the System Console to the Service Processor

The following example shows the character sequence (hash-period) used to change from the system console to the service processor:

```
ok #.
```

How to Switch From the Service Processor to the System Console

The following example showiest ILOM command for changing from the service processor to the system console:

```
-> start /SP/console
```

If you are connected to the service processor using the ALOM CMT shell, use the following command to change to the system console:

```
sc> console
```

Service-Related ILOM Command Summary

The following table describes the ILOM shell commands most frequently used when performing service related tasks. The middle column identifies the ALOM CMT command that produces the same result.

TABLE: Service-Related Commands

ILOM Command	ALOM CMT Command	Description
`help` *[command]*	`help` [*command*]	Displays a list of all available commands with syntax and descriptions. Specifying a command name as an option displays help for that command.
`set /HOST send_break_action=break`	`break` [`-y`][`-c`][`-D`] • `-y` skips the confirmation question. • `-c` executes a `console` command after the `break` command completes. • `-D` forces a core dump of the Solaris OS.	Takes the host server from the OS to either `kmdb` or OpenBoot PROM (equivalent to a Stop-A), depending on the mode Solaris software was booted.
`set /SYS/`*component* `clear_fault_action=true`	`clearfault` *UUID*	Manually clears host-detected faults. The *UUID* is the unique fault ID of the fault to be cleared.
`start /SP/console`	console [-f] • `-f` forces the console to have read and write capabilities.	Connects you to the host system.
`show /SP/console/history`	consolehistory [-b *lines* | -e *lines* | -v] [-g *lines*] [boot | run] The following options enable you to specify how the output is displayed: • `-g` *lines* specifies the number of lines to display before pausing. • `-e` *lines* displays *n* lines from the end of the buffer. • `-b` *lines* displays *n* lines from the beginning of the buffer. • `-v` displays the entire buffer. • `boot` | `run` specifies the log to display (`run` is the default log).	Displays the contents of the system's console buffer.

TABLE: Service-Related Commands *(Continued)*

ILOM Command	ALOM CMT Command	Description
set /HOST/bootmode *property*=*value* [where *property* is `state`, `config`, or `script`]	bootmode [normal] [reset_nvram] [config=*configname*] [bootscript=*string*]	Controls the host server OpenBoot PROM firmware method of booting.
`stop /SYS; start /SYS`	`powercycle` [`-f`] The `-f` option forces an immediate poweroff. Otherwise the command attempts a graceful shutdown.	Performs a `poweroff` followed by `poweron`.
`stop /SYS`	`poweroff` [`-y`] [`-f`] • `-y` enables you to skip the confirmation question. • `-f` forces an immediate shutdown.	Powers off the host server.
`start /SYS`	`poweron [-c]` • `-c` executes a `console` command after completion of the `poweron` command.	Powers on the host server.
`set /SYS/PS`*x* `prepare_to_remove_action=true`	`removefru /SYS/PS0 | /SYS/PS1`	Indicates if it is okay to perform a hot-swap of a power supply. This command does not perform any action. But this command provides a warning if the power supply should not be removed because the other power supply is not enabled.
`reset /SYS`	`reset` [`-y`] [-c] • `-y` enables you to skip the confirmation question. • `-c` executes a `console` command after completion of the `reset` command.	Generates a hardware reset on the host server.
`reset /SP`	`resetsc` [`-y`] • `-y` enables you to skip the confirmation question.	Reboots the service processor.
`set /SYS keyswitch_state=`*value* `normal | standby | diag | locked`	`setkeyswitch [-y]` *value* `normal | standby | diag | locked` • `-y` enables you to skip the confirmation question when setting the keyswitch to `stby`.	Sets the virtual keyswitch.

TABLE: Service-Related Commands *(Continued)*

ILOM Command	ALOM CMT Command	Description
`set /SYS/LOCATE value=`*value* [`Fast_blink	Off`]	`setlocator` *value* [`on	off`]	Turns the Locator LED on the server on or off.
(No ILOM equivalent.)	`showenvironment`	Displays the environmental status of the host server. This information includes system temperatures, power supply, front panel LED, hard drive, fan, voltage, and current sensor status. See "Display FRU Information With the `show` Command" on page 32.
`show faulty`	`showfaults` [`-v`]	Displays current system faults. See "Faults Displayed by `show faulty`" on page 29.
(No ILOM equivalent.)	`showfru` [`-g` *lines*] [`-s	-d`] [*FRU*] • `-g` *lines* specifies the number of lines to display before pausing the output to the screen. • `-s` displays static information about system FRUs (defaults to all FRUs, unless one is specified). • `-d` displays dynamic information about system FRUs (defaults to all FRUs, unless one is specified). See "Display FRU Information With the `show` Command" on page 32.	Displays information about the FRUs in the server.
`show /SYS keyswitch_state`	`showkeyswitch`	Displays the status of the virtual keyswitch.
`show /SYS/LOCATE`	`showlocator`	Displays the current state of the Locator LED as either on or off.
`show /SP/logs/event/list`	`showlogs` [`-b` *lines*	`-e` *lines*	`-v`] [`-g` *lines*] [`-p` `logtype[r|p]`]]	Displays the history of all events logged in the service processor event buffers (in RAM or the persistent buffers).
`show /HOST`	`showplatform` [`-v`]	Displays information about the operating state of the host system, the system serial number, and whether the hardware is providing service.

Related Information

- "Managing Components With Automatic System Recovery Commands" on page 50

Faults Displayed by `show faulty`

The ILOM `show faulty` command will display the following kinds of fault information.

- Environmental faults
- Invalid configurations
- Faults detected during POST session
- Faults detected by predictive self-healing (PSH) feature

Example of `show faulty` Output When No Fault is Present

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------


-------------------------------------------------------------------------------
```

Example of `show faulty` Output for Environmental Faults

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/FANBD0/FM0
/SP/faultmgmt/0     | timestamp              | Dec 14 23:01:32
/SP/faultmgmt/0/    | timestamp              | Dec 14 23:01:32 faults/0
/SP/faultmgmt/0/    | sp_detected_fault      | TACH at /SYS/FANBD0/FM0/F0 has
faults/0            |                        | exceeded low non-recoverable
                    |                        | threshold.
```

Example of `show faulty` Output for Faults Detected by POST

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB/CMP0/BR1/CH0/D0
/SP/faultmgmt/0     | timestamp              | Dec 14 23:01:32
/SP/faultmgmt/0/    | timestamp              | Dec 14 23:01:32 faults/0
faults/0            |                        |
/SP/faultmgmt/0/    | sp_detected_fault      | /SYS/MB/CMP0/BR1/CH0/D0
faults/0            |                        | Forced fail(POST)
```

Example of `show faulty` Output for Faults Detected by

```
-> show faulty
Target               | Property                 | Value
---------------------+--------------------------+------------------------------
/SP/faultmgmt/0      | fru                      | /SYS/MB/CMP0/BR0/CH1/D0
/SP/faultmgmt/0      | timestamp                | Dec 14 22:43:59
/SP/faultmgmt/0/     | sunw-msg-id              | SUN4V-8000-DX
faults/0             |                          |
/SP/faultmgmt/0/     | uuid                     | 3aa7c854-9667-e176-efe5-e487e520
faults/0             |                          | 7a8a
/SP/faultmgmt/0/     | timestamp                | Dec 14 22:43:59
faults/0             |                          |
```

Related Information

- "Clear FRU Faults Manually" on page 31
- "Display FRU Information With the `show` Command" on page 32

▼ Clear FRU Faults Manually

Use the `clear_fault_action` property of a FRU to manually clear faults recorded in a FRU PROM. There are two conditions where this step may be needed:

- To clear a fault diagnosed by the predictive self-healing feature without replacing the faulty FRU.
- To clear a fault that the service processor was unable to clear following a FRU replacement.

Note – This procedure clears the fault from the service processor but not from the host. If the fault persists in the host, it must be manually cleared.

- **At the `->` prompt, enter the `clear_fault_action` property.**

```
-> set /SYS/MB/CMP0/BR0/CH0/D0 clear_fault_action=True
Are you sure you want to clear /SYS/MB/CMP0/BR0/CH0/D0 (y/n)? y
Set 'clear_fault_action' to 'true'
```

Related Info

- "Clear PSH-Detected Faults" on page 47

▼ Display FRU Information With the `show` Command

- **At the `->` prompt, enter the `show` command.**

  The following example illustrates `show` command output for a memory module (FB-DIMM).

```
-> show /SYS/MB/CMP0/BR0/CH0/D0

/SYS/MB/CMP0/BR0/CH0/D0
   Targets:
       R0
       R1
       SEEPROM
       SERVICE
       PRSNT
       T_AMB

   Properties:
       type = DIMM
       component_state = Enabled
       fru_name = 1024MB DDR2 SDRAM FB-DIMM 333 (PC2 5300)
       fru_description = FBDIMM 1024 Mbyte
       fru_manufacturer = Micron Technology
       fru_version = FFFFFF
       fru_part_number = 18HF12872FD667D6D4
       fru_serial_number = d81813ce
       fault_state = OK
       clear_fault_action = (none)

   Commands:
       cd
       show
```

Related Information

- "Diagnostic Tools Overview" on page 15

▼ Create an ALOM CMT Shell

The default shell for the service processor is the ILOM shell. You can use the ALOM CMT compatibility shell to emulate the ALOM CMT interface that was supported on an earlier generation of CMT servers.

The service processor sends email alerts to all ALOM CMT users that are logged in. It also enters the event in the ILOM event log.

1. **Log onto the service processor with username** `root`**.**

   When powered on, the service processor boots to the ILOM login prompt. The factory default password is `changeme`.

```
login: root
Password:
Waiting for daemons to initialize...

Daemons ready

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Warning: password is set to factory default.
```

2. **Create a new user (in this example, the new user name is** `admin`**), setting the account role to** `Administrator` **and the CLI mode to** `alom`**.**

```
-> create /SP/users/admin
Creating user...
Enter new password: ********
Enter new password again: ********
Created /SP/users/admin
-> set /SP/users/admin role=Administrator
Set 'role' to 'Administrator'
-> set /SP/users/admin cli_mode=alom
Set 'cli_mode' to 'alom'
```

Note – The asterisks in the example will not appear when you enter your password.

You can combine the `create` and `set` commands on a single line:

```
-> create /SP/users/admin role=Administrator cli_mode=alom
Creating user...
Enter new password: ********
Enter new password again: ********
Created /SP/users/admin
```

3. **Log out of the root account after you have finished creating the new account.**

```
-> exit
```

4. **Log into the ALOM CLI shell (indicated by the `sc>` prompt) from the ILOM login prompt using the username and password you created in** Step 2**.**

```
login: admin
Password: ********
Waiting for daemons to initialize...

Daemons ready

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sc>
```

Note – Multiple service processor accounts can be active concurrently. A user can be logged in under one account using the ILOM shell, and another account using the ALOM CMT shell.

Related Information

- "Diagnostics Tools Quick Reference" on page 17
- "ILOM Troubleshooting Overview" on page 23
- "Service-Related ILOM Command Summary" on page 26

Detecting Faults With POST

These topics explain how to use POST as a diagnostic tool.

- "POST Overview" on page 35
- "ILOM Properties that Affect POST Behavior" on page 35
- "Examples of POST Management" on page 37
- "POST Output Quick Reference" on page 42

POST Overview

Power-on self-test (POST) is a group of PROM-based tests that run when the server is powered on or when it is reset. POST checks the basic integrity of the critical hardware components in the server (CMP, memory, and I/O subsystem).

If POST detects a faulty component, the component is disabled automatically. If the system is able to run without the disabled component, it will boot when POST completes its tests. For example, if POST detects a faulty processor core, the core will be disabled and, once POST completes its test sequence, the system will boot and run using the remaining cores.

You can control various aspects of how POST performs its operations. For example, you can specify the events that cause POST to run, the level of testing POST performs, and the amount of diagnostic information POST displays. You use the ILOM `set` command to control the state of the applicable ILOM properties. These properties are listed and described in "ILOM Properties that Affect POST Behavior" on page 35.

Related Information

- "Managing POST Operations" on page 35

Managing POST Operations

These topics explain how to control the way POST performs its operations.

- "ILOM Properties that Affect POST Behavior" on page 35
- "Examples of POST Management" on page 37

Related Information

- "ILOM Properties that Affect POST Behavior" on page 35
- "Examples of POST Management" on page 37
- "POST Output Quick Reference" on page 42

ILOM Properties that Affect POST Behavior

The following table describes the ILOM properties that determine how POST performs its operations.

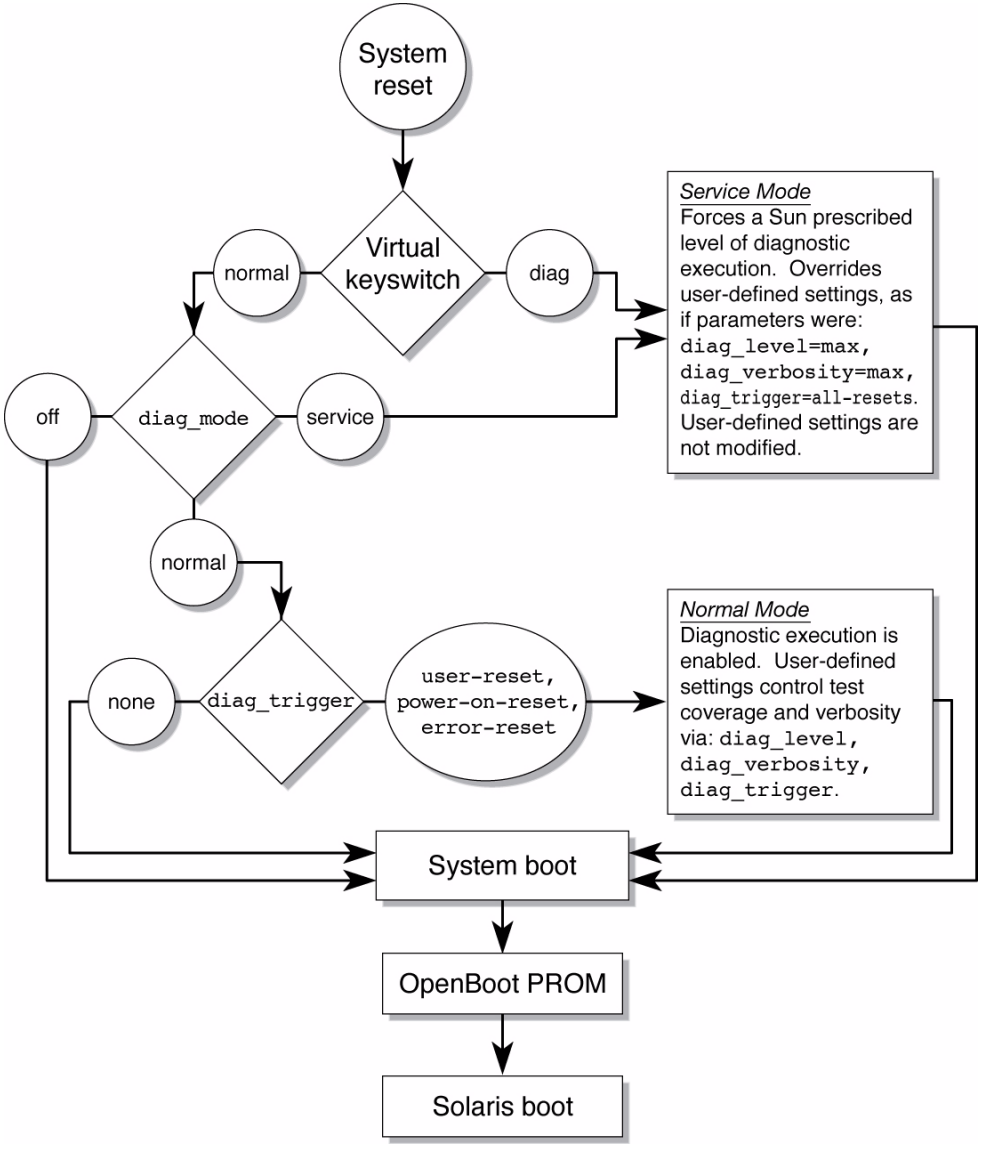
Note – The value of `keyswitch_state` must be `normal` when individual POST parameters are changed.

TABLE: ILOM Properties Used to Manage POST Operations

Parameter	Values	Description
`keyswitch_state`	`normal`	The system can power on and run POST (based on the other parameter settings). This parameter overrides all other commands.
	`diag`	The system runs POST based on predetermined settings.
	`stby`	The system cannot power on.
	`locked`	The system can power on and run POST, but no flash updates can be made.
`diag_mode`	`off`	POST does not run.
	`normal`	Runs POST according to `diag_level` value.
	`service`	Runs POST with preset values for `diag_level` and `diag_verbosity`.
`diag_level`	`max`	If `diag_mode` = `normal`, runs all the minimum tests plus extensive processor and memory tests.
	`min`	If `diag_mode` = `normal`, runs minimum set of tests.
`diag_trigger`	`none`	Does not run POST on reset.
	`user_reset`	Runs POST upon user initiated resets.
	`power_on_reset`	Only runs POST for the first power on. This option is the default.
	`error_reset`	Runs POST if fatal errors are detected.
	`all_resets`	Runs POST after any reset.
`diag_verbosity`	`none`	No POST output is displayed.
	`min`	POST output displays functional tests with a banner and pinwheel.
	`normal`	POST output displays all test and informational messages.
	`max`	POST displays all test, informational, and some debugging messages.

The following flowchart is a graphic illustration of the same set of ILOM `set` command variables.

FIGURE: Flowchart of ILOM Properties Used to Manage POST Operations



Examples of POST Management

This topic shows examples of the ILOM `set` command being used to configure POST behavior. The examples illustrate only a subset of the ILOM properties that can be used to control POST operations.

Note – When you change individual POST parameter values, the `keyswitch_state` value must be set to `normal`.

`keyswitch_state` *Set to* `normal`

You put POST in its default mode by setting the virtual `keyswitch` property to `normal`. This enables the system to turn on and for POST to `run`.

```
-> set /SYS keyswitch_state=normal
Set 'keyswitch_state' to 'normal'
```

`keyswitch_state` *Set to* `diag`

You can apply preconfigured diagnostic settings to POST operations by setting the virtual `keyswitch` property to `diag`.

```
-> set /SYS keyswitch_state=diag
Set 'keyswitch_state' to 'diag'
```

`diag_mode` *Set to* `off`

You can prevent POST from running by setting the `diag_mode` property to `off`.

```
-> set /SYS diag_mode=off
Set 'diag_mode' to 'off'
```

`diag_mode` *Set to* `service`

You force POST to run with a set of preconfigured values for diag_level and `diag_verbosity` by setting the `diag_mode` property to `service`.

```
-> set /SYS diag_mode=service
Set 'diag_mode' to 'service'
```

Related Information

- "ILOM Properties that Affect POST Behavior" on page 35
- "Run POST in Maximum Mode" on page 39
- "Clear POST-Detected Faults" on page 41

▼ Run POST in Maximum Mode

POST can be helpful when used as a first-stage diagnostic tool. When a fault's symptoms are unclear, you can run POST in maximum mode to generate extensive status information on all the key system components.

1. **From the ILOM prompt, set the virtual keyswitch to** `diag` **so that POST will run in service mode:**

```
-> set /SYS/keyswitch_state=Diag
Set 'keyswitch_state' to 'Diag'
```

2. **Reset the system so that POST runs.**

   There are several ways to initiate a reset. The following example shows a reset using a power cycle command sequence. For other methods, refer to the *Sun SPARC Enterprise T5120 and T5220 Servers Administration Guide*.

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – The server takes about one minute to power off.

3. **Switch to the system console to view the POST output.**

   The following is an partial example of POST output.

```
-> start /SP/console
------------------------------------------------------------------
...
------------------------------------------------------------------
2007-12-19 22:01:17.810 0:0:0>INFO: STATUS: Running RGMII 1G
BCM5466R PHY level Loopback Test
2007-12-19 22:01:22.534 0:0:0>End  : Neptune 1G Loopback Test -
Port 2
2007-12-19 22:01:22.542 0:0:0>Begin: Neptune 1G Loopback Test -
Port 3
2007-12-19 22:01:22.553 0:0:0>
2007-12-19 22:01:22.556 0:0:0>INFO: STATUS: Running BMAC level
Loopback Test
2007-12-19 22:01:27.271 0:0:0>
2007-12-19 22:01:27.274 0:0:0>INFO: STATUS: Running RGMII 1G
BCM5466R PHY level Loopback Test
```

```
----------------------------------------------------------------
2007-12-19 22:01:32.004 0:0:0>End  : Neptune 1G Loopback Test -
Port 3
2007-12-19 22:01:32.012 0:0:0>INFO:
2007-12-19 22:01:32.019 0:0:0>POST Passed all devices.
2007-12-19 22:01:32.028 0:0:0>POST:Return to VBSC.
2007-12-19 22:01:32.036 0:0:0>Master set ACK for vbsc runpost
command and spin...
----------------------------------------------------------------

T5220, No Keyboard
OpenBoot ..., 7968 MB memory available, Serial #75916434.
[stacie obp #0]
Ethernet address 0:14:4f:86:64:92, Host ID: xxxxx



{0} ok
```

4. **If POST detects a faulty device, information about the device will be passed to the service processor for handling. Fault information will also be displayed.**

Note – If POST does not detect a fault, the system will boot. In this case, the problem being investigated probably falls outside the scope of POST's test coverage. POST's failure to detect any faults should be considered diagnostic data as well.

---

5. **Evaluate the test information returned by POST.**

   See "POST Output Quick Reference" on page 42 for a summary of the syntax used in POST fault reporting.

6. **Run the ILOM** `show faulty` **command to obtain additional fault information.**

   If `show faulty` detects a fault, the service processor logs the fault, disables the faulty component and causes the Service Required LED to light. In the following example, FB-DIMM module /SYS/MB/CMP0/BR1/CH0/D0 is disabled.

```
-> show faulty
Target                 | Property                | Value
-----------------------+-------------------------+-----------------------------
/SP/faultmgmt/0        | fru                     | /SYS/MB/CMP0/BR1/CH0/D0
/SP/faultmgmt/0        | timestamp               | Dec 21 16:40:56
/SP/faultmgmt/0/       | timestamp               | Dec 21 16:40:56
faults/0               |                         |
/SP/faultmgmt/0/       | sp_detected_fault       | /SYS/MB/CMP0/BR1/CH0/D0
faults/0               |                         | Forced fail(POST)
```

Note – The system can boot and run using memory that was not disabled.

Related Information

- "Clear POST-Detected Faults" on page 41
- "Examples of POST Management" on page 37
- "POST Output Quick Reference" on page 42

▼ Clear POST-Detected Faults

In most cases, when POST detects a faulty component, POST logs the fault and automatically takes the failed component out of operation by placing the component in the ASR blacklist. See "Managing Components With Automatic System Recovery Commands" on page 50.

In most cases, the replacement of the faulty FRU is detected when the service processor is reset or power cycled. In this case, the fault is automatically cleared from the system. This procedure describes how to identify a POST detected fault and, if necessary, manually clear the fault.

1. **After replacing a faulty FRU, enter the** `show faulty` **command to identify any faults detected by POST.**

   POST-detected faults are distinguished by the text `Forced fail`. No UUID number is reported for POST-detected. The following example shows `show faulty` output for a failed memory module in FB-DIMM slot /SYS/MB/CMP0/BR1/CMP0/D0.

```
-> show faulty
Target                | Property                | Value
----------------------+-------------------------+----------------------------
/SP/faultmgmt/0       | fru                     | /SYS/MB/CMP0/BR1/CH0/D0
/SP/faultmgmt/0       | timestamp               | Dec 21 16:40:56
/SP/faultmgmt/0/      | timestamp               | Dec 21 16:40:56
faults/0              |                         |
/SP/faultmgmt/0/      | sp_detected_fault       | /SYS/MB/CMP0/BR1/CH0/D0
faults/0              |                         | Forced fail(POST)
```

   If no fault is reported, this procedure is complete. Do not perform the subsequent steps.

2. **Clear the fault by setting the FRU's** `component_state` **property to** `Enabled`**. This will remove the component from the ASR blacklist.**

   Use the FRU name that was reported in the fault in Step 1:

```
-> set /SYS/MB/CMP0/BR1/CH0/D0 component_state=Enabled
```

   The fault is cleared and should not show up when you run the `show faulty` command. Additionally, the Service Required LED is no longer on.

3. **Reset the server.**

   You must reboot the server for the change to the `component_state` property to take effect.

4. **At the ILOM prompt, use the** `show faulty` **command to verify that no faults are reported.**

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+------------------

->
```

POST Output Quick Reference

POST error messages use the following syntax:

```
c:s > ERROR: TEST = failing-test
c:s > H/W under test = FRU
c:s > Repair Instructions: Replace items in order listed by H/W
under test above
c:s > MSG = test-error-message
c:s > END_ERROR
```

In this syntax, *c* = the core number, *s* = the strand number.

Warning messages use the following syntax:

```
WARNING: message
```

Informational messages use the following syntax:

```
INFO: message
```

The following example. POST reports a memory error at FB-DIMM location /SYS/MB/CMP0/BR1/CH0/D0. The error was detected by POST running on core 7, strand 2.

```
7:2>
7:2>ERROR: TEST = Data Bitwalk
7:2>H/W under test = /SYS/MB/CMP0/BR1/CH0/D0
7:2>Repair Instructions: Replace items in order listed by 'H/W
under test' above.
7:2>MSG = Pin 149 failed on /SYS/MB/CMP0/BR1/CH0/D0 (J2001)
7:2>END_ERROR

7:2>Decode of Dram Error Log Reg Channel 2 bits
60000000.0000108c
7:2> 1 MEC 62 R/W1C Multiple corrected
errors, one or more CE not logged
7:2> 1 DAC 61 R/W1C Set to 1 if the error
was a DRAM access CE
7:2> 108c SYND 15:0 RW ECC syndrome.
7:2>
7:2> Dram Error AFAR channel 2 = 00000000.00000000
7:2> L2 AFAR channel 2 = 00000000.00000000
```

Related Information

- "ILOM Properties that Affect POST Behavior" on page 35
- "Examples of POST Management" on page 37
- "Run POST in Maximum Mode" on page 39
- "Clear POST-Detected Faults" on page 41

Managing Faults Using the PSH Feature

These topics explain how to use the Solaris Predictive Self-Healing (PSH) feature to diagnose conditions that may develop into hardware failures over time, allowing for corrective intervention before the failure occurs.

- "Solaris PSH Feature Overview" on page 44
- "PSH-Detected Fault Console Message" on page 45
- "Identify PSH-Detected Faults With `fmdump`" on page 45
- "Clear PSH-Detected Faults" on page 47

Solaris PSH Feature Overview

The Solaris OS uses the Fault Manager daemon, `fmd(1M)`, which starts at boot time and runs in the background to monitor the system. If a component generates an error, the daemon handles the error by correlating the error with data from previous errors and other related information to diagnose the problem. Once diagnosed, the Fault Manager daemon assigns the problem a Universal Unique Identifier (UUID) that distinguishes the problem across any set of systems. When possible, the Fault Manager daemon initiates steps to self-heal the failed component and take the component offline. The daemon also logs the fault to the `syslogd` daemon and provides a fault notification with a message ID (MSGID). You can use the message ID to get additional information about the problem from the knowledge article database.

The Predictive Self-Healing technology covers the following server components:

- Multicore processor
- Memory
- I/O subsystem

The PSH console message provides the following information about each detected fault:

- Type
- Severity
- Description
- Automated response
- Impact
- Suggested action

If the Solaris PSH facility detects a faulty component, use the `fmdump` command to identify the fault. Faulty FRUs are identified in fault messages using the FRU name.

PSH-Detected Fault Console Message

When a PSH fault is detected, a Solaris console message displayed. The following example illustrates the type of information contained in a console message generated when a PSH fault is detected.

```
SUNW-MSG-ID: SUN4V-8000-DX, TYPE: Fault, VER: 1, SEVERITY: Minor
EVENT-TIME: Wed Sep 14 10:09:46 EDT 2005
PLATFORM: SUNW,system_name, CSN: -, HOSTNAME: wgs48-37
SOURCE: cpumem-diagnosis, REV: 1.5
EVENT-ID: f92e9fbe-735e-c218-cf87-9e1720a28004
DESC: The number of errors associated with this memory module has exceeded
```

```
acceptable levels. Refer to http://sun.com/msg/SUN4V-8000-DX for more
information.
AUTO-RESPONSE: Pages of memory associated with this memory module are being
removed from service as errors are reported.
IMPACT: Total system memory capacity will be reduced as pages are retired.
REC-ACTION: Schedule a repair procedure to replace the affected memory module.
Use fmdump -v -u <EVENT_ID> to identify the module.
```

PSH-detected faults also cause the Service Required LED to be turned on.

Use the ILOM `show faulty` command to view summary information about the fault. See "Faults Displayed by `show faulty`" on page 29 for more information about the `show faulty` command.

Faults detected by the Solaris PSH facility are also reported through service processor alerts.

```
SC Alert: Most detected fault, MSGID: SUN4v-8000-DX
```

Note – You must be logged in to the ALOM CMT shell to see Solaris PSH fault alerts.

▼ Identify PSH-Detected Faults With `fmdump`

The `fmdump` command displays the list of faults detected by the Solaris PSH facility and identifies the faulty FRU for a particular EVENT_ID (UUID).

Note – The information `fmdump` displays is taken from the PSH event log, which retains the fault data after the fault has been repaired. For that reason, `fmdump` cannot be used to verify that a FRU replacement has cleared a fault. Instead, use the `fmadm faulty` command to verify that the fault has cleared.

---

1. **Check the event log using the `fmdump` command with `-v` for verbose output.**

```
# fmdump -v -u fd940ac2-d21e-c94a-f258-f8a9bb69d05b
TIME                 UUID                                 SUNW-MSG-ID
Jul 31 12:47:42.2008 fd940ac2-d21e-c94a-f258-f8a9bb69d05b SUN4V-8000-JA
  100%  fault.cpu.ultraSPARC-T2.misc_regs

        Problem in: cpu:///cpuid=16/serial=5D67334847
           Affects: cpu:///cpuid=16/serial=5D67334847
               FRU: hc://:serial=101083:part=541215101/motherboard=0
                 Location: MB
```

In this example, the following information is provided about the detected fault:

- Date and time of the fault (Jul 31 12:47:42.2008)
- Universal Unique Identifier (UUID). The UUID is unique for every fault (`fd940ac2-d21e-c94a-f258-f8a9bb69d05b`)
- Message identifier, which can be used to obtain additional fault information (`SUN4V-8000-JA`)
- Details about the faulted FRU. This includes the FRU's part number (`part=541215101`) and serial number (`serial=101083`). The `Location` field provides the name of the FRU. In this example, the FRU name is `MB`, meaning the motherboard.

2. **Use the message ID to obtain more information about this type of fault.**

   a. **In a browser, go to the Predictive Self-Healing Knowledge Article web site:**

      `(http://www.sun.com/msg)`

   b. **Obtain the message ID from the console output or the ILOM `show faulty` command.**

   c. **Enter the message ID in the SUNW-MSG-ID field, and click Lookup.**

      In the following example, the message ID SUN4V-8000-JA provides information for corrective action:

```
CPU errors exceeded acceptable levels
Type
    Fault
Severity
    Major
Description
    The number of errors associated with this CPU has exceeded
    acceptable levels.
Automated Response
    The fault manager will attempt to remove the affected CPU from
    service.
```

```
Impact
    System performance may be affected.

Suggested Action for System Administrator
    Schedule a repair procedure to replace the affected CPU, the
    identity of which can be determined using fmdump -v -u
    <EVENT_ID>.

Details
    The Message ID:  SUN4V-8000-JA indicates diagnosis has
    determined that a CPU is faulty. The Solaris fault manager
    arranged an automated attempt to disable this CPU....
```

3. **Follow the suggested actions to repair the fault.**

▼ Clear PSH-Detected Faults

When the Solaris PSH facility detects faults, the faults are logged and displayed on the console. In most cases, after the fault is repaired, the corrected state is detected by the system, and the fault condition is repaired automatically. However, this repair should be verified. In cases where the fault condition is not automatically cleared, the fault must be cleared manually.

1. **After replacing a faulty FRU, power on the server.**
2. **At the ILOM prompt, use the** `show faulty` **command to identify PSH detected faults.**

   PSH-detected faults are distinguished from other kinds of faults by the presence of a `sunw-msg-id` and `uuid` property.

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+------------------------------
/SP/faultmgmt/0      | fru                     | /SYS/MB/CMP0/BR0/CH1/D0
/SP/faultmgmt/0      | timestamp               | Dec 14 22:43:59
/SP/faultmgmt/0/     | sunw-msg-id             | SUN4V-8000-DX
faults/0             |                         |
/SP/faultmgmt/0/     | uuid                    | 3aa7c854-9667-e176-efe5-e487e520
faults/0             |                         | 7a8a
/SP/faultmgmt/0/     | timestamp               | Dec 14 22:43:59
faults/0             |                         |
```

The next step depends on whether or not a fault was reported.

- If `show faulty` does not report a fault, stop. Do not go on to the next step.
- If a fault is reported, perform Step 3 and Step 4.

3. **Use the** `clear_fault_action` **property of the FRU to clear the fault from the service processor.**

```
-> set /SYS/MB/CMP0/BR0/CH0/D0 clear_fault_action=True
Are you sure you want to clear /SYS/MB/CMP0/BR0/CH0/D0 (y/n)? y
Set 'clear_fault_action' to 'true
```

4. **Clear the fault from all persistent fault records.**

   In some cases, even though the fault is cleared, some persistent fault information remains and results in erroneous fault messages at boot time. To ensure that these messages are not displayed, run the Solaris command `fmadm repair`, specifying the UUID of the erroneous message.

```
# fmadm repair 7ee0e46b-ea64-6565-e684-e996963f7b86
```

Viewing Solaris OS Messages

These topics explain how to display OS messages from the message buffer and log files maintained by Solaris OS.

- "Check the Message Buffer" on page 49
- "View the System Message Log Files" on page 49

▼ Check the Message Buffer

1. **Log in as superuser.**
2. **Type the** `dmesg` **command:**

```
# dmesg
```

The `dmesg` command displays the most recent messages generated by the system.

▼ View the System Message Log Files

The error logging daemon, `syslogd`, automatically records various system warnings, errors, and faults in message files. These messages can alert you to system problems such as a device that is about to fail.

The `/var/adm` directory contains several message files. The most recent messages are in the `/var/adm/messages` file. After a period of time (usually every week), a new `messages` file is automatically created. The original contents of the `messages` file are rotated to a file named `messages.1`. Over a period of time, the messages are further rotated to `messages.2` and `messages.3`, and then deleted.

1. **Log in as superuser.**
2. **Type the following command:**

```
# more /var/adm/messages
```

3. **If you want to view all logged messages, type the following command:**

```
# more /var/adm/messages*
```

Managing Components With Automatic System Recovery Commands

These topics explain the role played by the Automatic System Recovery (ASR) feature and how to manage the components it controls.

- "ASR Overview" on page 50
- "View the System Message Log Files" on page 49
- "Display System Components" on page 51
- "Disable System Components" on page 52
- "Enable System Components" on page 53

ASR Overview

The ASR feature enables the server to automatically configure failed components out of operation until they can be replaced. In the server, the following components are managed by the ASR feature:

- UltraSPARC T2 Plus processor strands
- Memory FB-DIMMs
- I/O subsystem

The database that contains the list of disabled components is referred to as the ASR blacklist (`asr-db`).

In most cases, POST automatically disables a faulty component. After the cause of the fault is repaired (FRU replacement, loose connector reseated, and so on), you might need to remove the component from the ASR blacklist.

The following ASR commands enable you to view and add or remove components (`asrkeys`) from the ASR blacklist. You run these commands from the ILOM `->` prompt.

Command	Description
`show components`	Displays system components and their current state.
`set` *asrkey* `component_state=Enabled`	Removes a component from the `asr-db` blacklist, where *asrkey* is the component to enable.
`set` *asrkey* `component_state=Disabled`	Adds a component to the `asr-db` blacklist, where *asrkey* is the component to disable.

Note – The `asrkeys` vary from system to system, depending on how many cores and memory are present. Use the `show components` command to see the `asrkeys` on a given system.

After you enable or disable a component, you must reset (or power cycle) the system for the component's change of state to take effect.

Related Information

- "Display System Components" on page 51
- "Disable System Components" on page 52
- "Enable System Components" on page 53

▼ Display System Components

The `show components` command displays the system components (`asrkeys`) and reports their status.

- **At the -> prompt, enter the** `show components` **command.**

  In the following example, PCIE3 is shown as disabled.

```
-> show components
Target               | Property               | Value
---------------------+------------------------+------------------------------
/SYS/MB/RISER0/      | component_state        | Enabled
PCIE0                |                        |
/SYS/MB/RISER0/      | component_state        | Disabled
PCIE3                |                        |
/SYS/MB/RISER1/      | component_state        | Enabled
PCIE1                |                        |
/SYS/MB/RISER1/      | component_state        | Enabled
PCIE4                |                        |
/SYS/MB/RISER2/      | component_state        | Enabled
PCIE2                |                        |
/SYS/MB/RISER2/      | component_state        | Enabled
PCIE5                |                        |
/SYS/MB/NET0         | component_state        | Enabled
/SYS/MB/NET1         | component_state        | Enabled
/SYS/MB/NET2         | component_state        | Enabled
/SYS/MB/NET3         | component_state        | Enabled
/SYS/MB/PCIE         | component_state        | Enabled
```

Related Information

- "View the System Message Log Files" on page 49
- "Disable System Components" on page 52
- "Enable System Components" on page 53

▼ Disable System Components

You disable a component by setting its `component_state` property to `Disabled`. This adds the component to the ASR blacklist.

1. **At the** `->` **prompt, set the** `component_state` **property to** `Disabled`**.**

```
-> set /SYS/MB/CMP0/BR1/CH0/D0 component_state=Disabled
```

2. **Reset the server so that the ASR command takes effect.**

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
```

```
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – In the ILOM shell there is no notification when the system is actually powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

Related Information

- "View the System Message Log Files" on page 49
- "Display System Components" on page 51
- "Enable System Components" on page 53

▼ Enable System Components

You enable a component by setting its `component_state` property to `Enabled`. This removes the component from the ASR blacklist.

1. At the `->` prompt, set the `component_state` property to `Enabled`.

```
-> set /SYS/MB/CMP0/BR1/CH0/D0 component_state=Enabled
```

2. Reset the server so that the ASR command takes effect.

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – In the ILOM shell there is no notification when the system is actually powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

Related Information

- "View the System Message Log Files" on page 49
- "Display System Components" on page 51
- "Disable System Components" on page 52

Detecting Faults Using SunVTS Software

This topic explains in general terms how to use SunVTS software to exercise system components. For detailed instructions on using SunVTS software, see the latest version of the SunVTS Software User's Guide and any associated Release Notes.

■ "Run the SunVTS Software" on page 54

▼ Run the SunVTS Software

The following procedure description is based on use of the SunVTS software's browser interface, which is the default interface. SunVTS software also supports a TTY user interface and a command-line interface (CLI). All three interfaces are described in the SunVTS Software User's Guide.

1. **Start the agent and Javabridge on the server.**

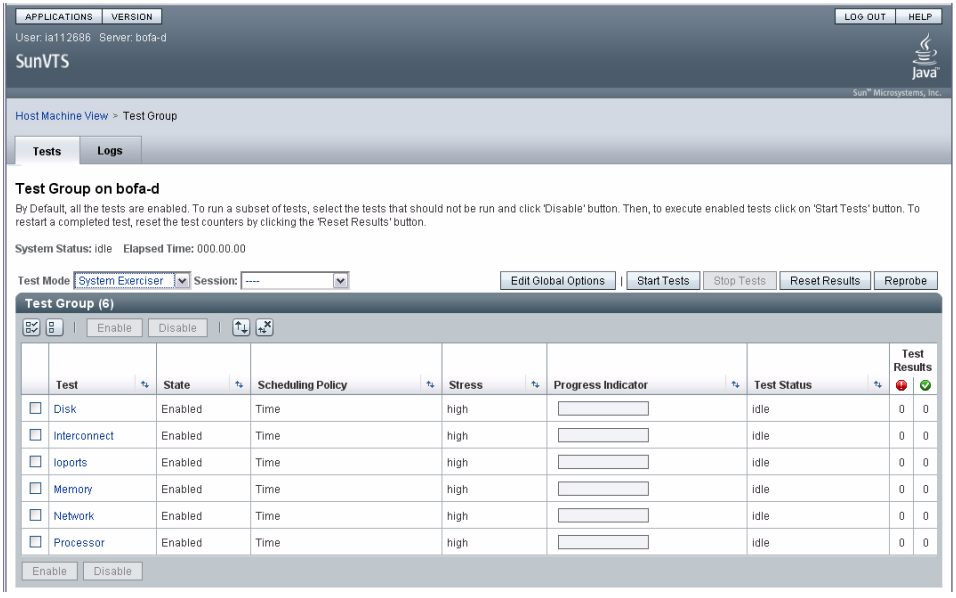
```
# cd /usr/sunvts/bin
# ./startsunvts
```

2. **At the interface prompt, choose C to start the SunVTS client.**

3. **Start SunVTS browser environment from a web browser on the client system. In the browser's address field type:** `http://`*servername*`:6789`**.**

   This causes the SunVTS browser interface to be displayed.

FIGURE: SunVTS Browser Interface


APPLICATIONS
VERSION
LOG OUT
HELP
User: ia112686 Server: bofa-d
SunVTS
Java
Sun Microsystems, Inc.
Host Machine View > Test Group
Tests
Logs
Test Group on bofa-d
By Default, all the tests are enabled. To run a subset of tests, select the tests that should not be run and click 'Disable' button. Then, to execute enabled tests click on 'Start Tests' button. To restart a completed test, reset the test counters by clicking the 'Reset Results' button.
System Status: idle Elapsed Time: 000.00.00
Test Mode System Exerciser Session: ----
Edit Global Options
Start Tests
Stop Tests
Reset Results
Reprobe
Test Group (6)
Enable
Disable
Test
State
Scheduling Policy
Stress
Progress Indicator
Test Status
Test Results
Disk Enabled Time high idle 0 0
Interconnect Enabled Time high idle 0 0
Ioports Enabled Time high idle 0 0
Memory Enabled Time high idle 0 0
Network Enabled Time high idle 0 0
Processor Enabled Time high idle 0 0
Enable
Disable

4. **(Optional) Select the test category you want to run.**

   The following are test categories that are recommended for running on this server.

SunVTS Tests	Field Replaceable Units Exercised by Tests
Memory Test	FB-DIMMs
Processor Test	CMP, motherboard
Disk Test	Disks, cables, disk backplane, DVD drive
Network Test	Network interface, network cable, CMP, motherboard
Interconnect Test	Board ASICs and interconnects
IO Ports Test	I/O (serial port interface), USB subsystem
Environment Test	Motherboard and service processor

5. **(Optional) Customize individual tests.**

   Click on the name of the test to select and customize individual tests.

Note – Use the System Excerciser – High Stress Mode to test system operations. Use the Component Stress – High setting for the highest stress possible.

6. **Click the Start button to start the test process. Status and error messages appear in the test messages area located across the bottom of the window. You can stop testing at any time by clicking the Stop button**

   Status and error messages appear in the test messages area spread across the bottom of the window.

Note – You can stop the test process at any time by clicking on the Stop button.

---

7. **To check for SunVTS messages, click on the Logs tab.**

   You can view any of the following logs:

   - **Information** – Detailed versions of all the status and error messages that appear in the test messages area.
   - **Test Error** – Detailed error messages from individual tests.
   - **VTS Kernel (**`vtsk`**) Error** – Error messages pertaining to SunVTS software itself. Look here if SunVTS software appears to be acting strangely, especially when it starts up.
   - **Solaris OS Message***s* (`/var/adm/messages`) – A file containing messages generated by the operating system and various applications.
   - **Test Messages** (`/var/sunvts/logs`) – A directory containing the log files.

Preparing to Service the System

These topics describe how to prepare the Sun SPARC Enterprise T5120 and T5220 servers for servicing.

- "General Safety Information" on page 57
- "Essential Tools" on page 59
- "Removing Power From the System" on page 60
- "Positioning the System for Servicing" on page 62
- "Accessing Internal Components" on page 66

General Safety Information

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment and described in the documentation shipped with your system.
- Follow all cautions and instructions marked on the equipment and described in the *Sun SPARC Enterprise T5120 and T5220 Servers Safety and Compliance Guide*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Follow the electrostatic discharge safety practices as described in this section.

Safety Symbols

You will see the following symbols in various places in the server documentation. Note the explanations provided next to each symbol.

Caution – There is a risk of personal injury or equipment damage. To avoid personal injury and equipment damage, follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Electrostatic Discharge Safety Measures

Electrostatic discharge (ESD) sensitive devices, such as the motherboards, PCI cards, hard drives, and memory cards require special handling.

Caution – Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components along their connector edges.

Caution – You must disconnect both power supplies before servicing any of the components documented in this chapter.

Antistatic Wrist Strap Use

Wear an antistatic wrist strap and use an antistatic mat when handling components such as hard drive assemblies, circuit boards, or PCI cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Note – An antistatic wrist strap is no longer included in the accessory kit for the Sun SPARC Enterprise T5120 and T5220 servers. However, antistatic wrist straps are still included with options.

Antistatic Mat

Place ESD-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat.

Essential Tools

The following tools should be available for most service operations:

- Antistatic wrist strap
- Antistatic mat
- No. 1 Phillips screwdriver
- No. 2 Phillips screwdriver
- No. 1 flat-blade screwdriver (battery removal)
- Pen or pencil (to power on server)

▼ Find the Chassis Serial Number

If you require technical support for your system, you will be asked to provide the server's chassis serial number. You can find the chassis serial number on a sticker located on the front of the server and on another sticker on the side of the server.

If it is not convenient to read either sticker, you can run the ILOM `show /SYS` command to obtain the chassis serial number.

- **Type show /SYS at the ILOM prompt.**

```
-> show /SYS

/SYS
   Targets:
        SERVICE
        LOCATE
        ACT
        PS_FAULT
        TEMP_FAULT
        FAN_FAULT
...
```

```
    Properties:
        type = Host System
        keyswitch_state = Normal
        product_name = T5220
        product_serial_number = 0723BBC006
        fault_state = OK
        clear_fault_action = (none)
        power_state = On

    Commands:
        cd
        reset
        set
        show
        start
        stop
```

Removing Power From the System

These topics describe different methods for removing power from the chassis.

- "Power Off the Server (Service Processor Command)" on page 60
- "Power Off the Server (Power Button - Graceful)" on page 62
- "Power Off the Server (Emergency Shutdown)" on page 62
- "Disconnect Power Cords From the Server" on page 62

Related Information

- "Servicing Motherboard Components" on page 81
- "Servicing Boards and Components" on page 137

▼ Power Off the Server (Service Processor Command)

You can use the service processor to perform a graceful shutdown of the server, and to ensure that all of your data is saved and the server is ready for restart.

Note – Additional information about powering off the server is located in the *Sun SPARC Enterprise T5120 and T5220 Servers Administration Guide*.

1. **Log in as superuser or equivalent.**

   Depending on the type of problem, you might want to view server status or log files. You also might want to run diagnostics before you shut down the server. Refer to the *Sun SPARC Enterprise T5120 and T5220 Servers Administration Guide* for log file information.

2. **Notify affected users that the server will be shut down.**

   Refer to your Solaris system administration documentation for additional information.

3. **Save any open files and quit all running programs.**

   Refer to your application documentation for specific information on these processes.

4. **Shut down all logical domains.**

   Refer to the Solaris system administration documentation for additional information.

5. **Shut down the Solaris OS.**

   Refer to the Solaris system administration documentation for additional information.

6. **Switch from the system console to the** `->` **prompt by typing the** `#.` **(Hash Period) key sequence.**

7. **At the** `->` **prompt, type the** `stop /SYS` **command.**

Note – You can also use the Power button on the front of the server to initiate a graceful server shutdown. (See "Power Off the Server (Power Button - Graceful)" on page 62.) This button is recessed to prevent accidental server power-off. Use the tip of a pen to operate this button.

Refer to the *Sun Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun SPARC Enterprise T5120 and T5220 Servers* for more information about the `poweroff` command.

Related Information

- "Power Off the Server (Power Button - Graceful)" on page 62
- "Power Off the Server (Emergency Shutdown)" on page 62

▼ Power Off the Server (Power Button - Graceful)

- **Press and release the Power button.**

  If necessary, use a pen or pencil to press the Power button.

Related Information

- "Power Off the Server (Service Processor Command)" on page 60
- "Power Off the Server (Emergency Shutdown)" on page 62

▼ Power Off the Server (Emergency Shutdown)

Caution – All applications and files will be closed abruptly without saving changes. File system corruption might occur.

- **Press and hold the Power button for four seconds.**

Related Information

- "Power Off the Server (Service Processor Command)" on page 60
- "Power Off the Server (Power Button - Graceful)" on page 62

▼ Disconnect Power Cords From the Server

- **Unplug all power cords from the server.**

Caution – Because 3.3v standby power is always present in the system, you must unplug the power cords before accessing any cold-serviceable components.

Positioning the System for Servicing

These topics explain how to position the system so you can access the components that need servicing.

- "Extend the Server to the Maintenance Position" on page 63
- "Remove the Server From the Rack" on page 64

▼ Extend the Server to the Maintenance Position

The following components can be serviced with the server in the maintenance position:

- Hard drives
- Fan modules
- Power supplies
- DVD/USB module
- Fan power boards
- FB-DIMMs
- PCIe/XAUI cards
- Motherboard battery
- SCC module

If the server is installed in a rack with extendable slide rails, use this procedure to extend the server to the maintenance position.

1. **(Optional) Use the** `set /SYS/LOCATE` **command from the** `->` **prompt to locate the system that requires maintenance.**

```
-> set /SYS/LOCATE value=Fast_Blink
```

   Once you have located the server, press the Locator LED and button to turn it off.

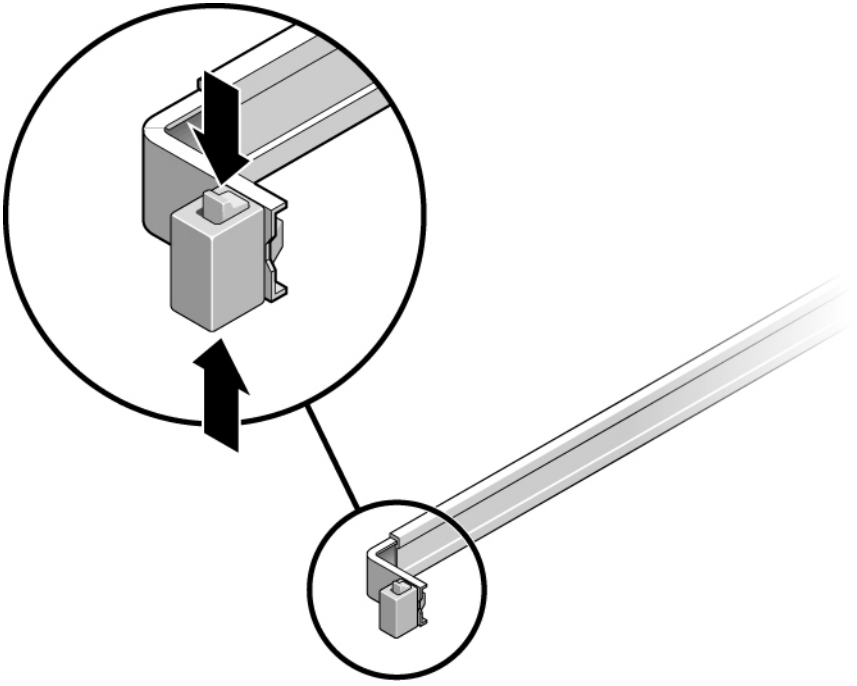
2. **Verify that no cables will be damaged or will interfere when the server is extended.**

   Although the cable management arm (CMA) that is supplied with the server is hinged to accommodate extending the server, you should ensure that all cables and cords are capable of extending.

3. **From the front of the server, release the two slide release latches, as shown in the following figure.**

   Squeeze the green slide release latches to release the slide rails.

FIGURE: Slide Release Latches



4. **While squeezing the slide release latches, slowly pull the server forward until the slide rails latch.**

▼ Remove the Server From the Rack

The server must be removed from the rack to remove or install the following components:

- Motherboard
- Power distribution board
- Power supply backplane (Sun SPARC Enterprise T5220 server)
- Paddle card
- Disk cage
- Hard drive backplane
- Front panel light-pipe assemblies

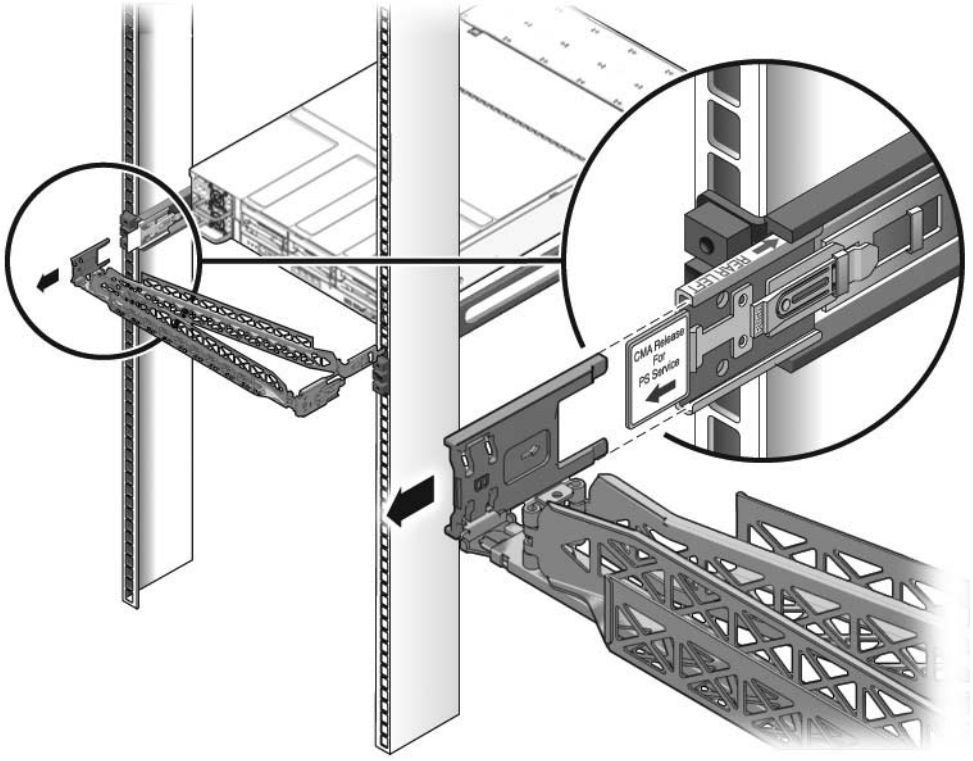
Caution – If necessary, use two people to dismount and carry the chassis.

1. **Disconnect all the cables and power cords from the server.**
2. **Extend the server to the maintenance position.**

   See "Power Off the Server (Service Processor Command)" on page 60.
3. **Press the metal lever that is located on the inner side of the rail to disconnect the cable management arm (CMA) from the rail assembly, as shown in the following figure.**

   The CMA is still attached to the cabinet, but the server chassis is now disconnected from the CMA.

FIGURE: Metal Lever and Cable Management Arm

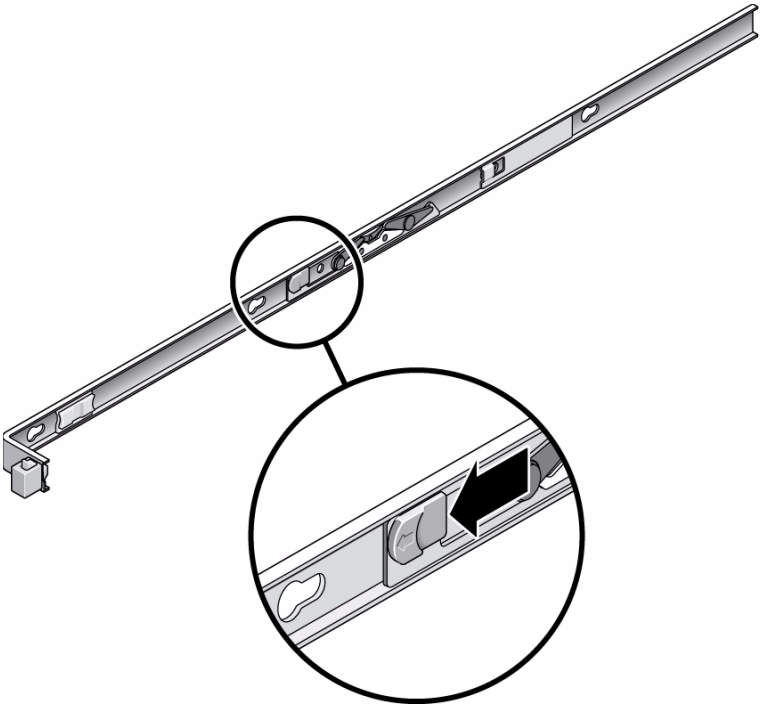


Caution – If necessary, use two people to dismount and carry the chassis.

4. **From the front of the server, pull the release tabs forward and pull the server forward until it is free of the rack rails as shown in the following figure.**

   A release tab is located on each rail.

FIGURE: Release Tabs and Slide Assembly



5. **Set the server on a sturdy work surface.**

Accessing Internal Components

These topics explain how to access components contained within the chassis and the steps needed to protect against damage or injury from electrostatic discharge.

- "Perform Electrostatic Discharge Prevention Measures" on page 67
- "Remove the Top Cover" on page 67

▼ Perform Electrostatic Discharge Prevention Measures

Many components housed within the chassis can be damaged by electrostatic discharge. To protect these components from damage, perform the following steps before opening the chassis for service.

1. **Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.**

   Place ESD-sensitive components such as the printed circuit boards on an antistatic mat. The following items can be used as an antistatic mat:

   - Antistatic bag used to wrap a replacement part
   - ESD mat
   - A disposable ESD mat (shipped with some replacement parts or optional system components)

2. **Attach an antistatic wrist strap.**

   When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

Related Information

- "General Safety Information" on page 57

▼ Remove the Top Cover

1. **Unlatch the fan module door.**

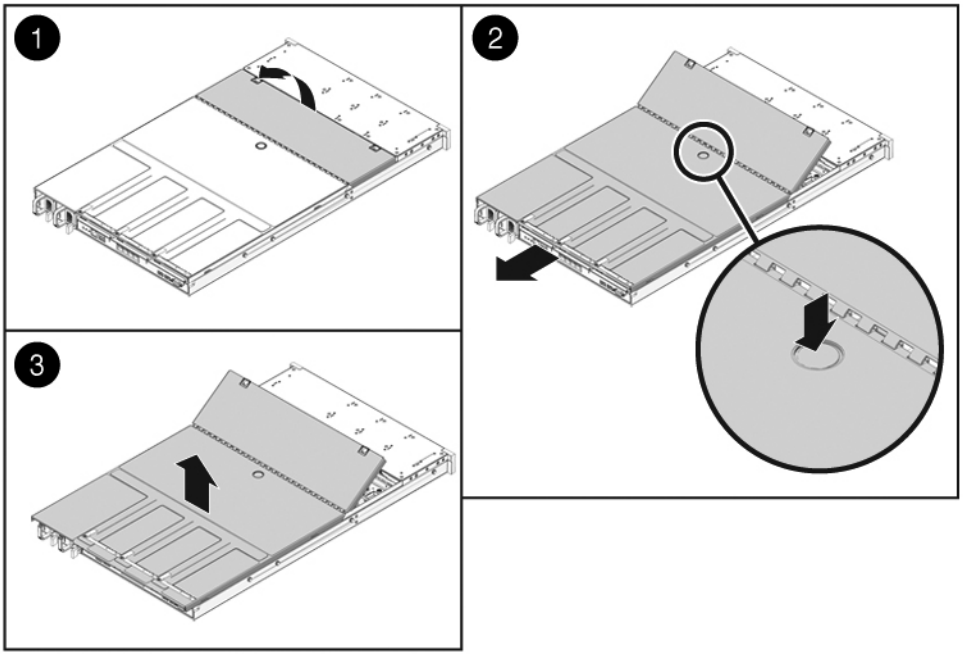
   Pull the release tabs back to release the door.

2. **Press the top cover release button and slide the top cover to the rear about a 0.5 inch (12.7 mm).**

   The following figure shows the release button in a Sun SPARC Enterprise T5120 server. The top cover release button in a Sun SPARC Enterprise T5220 server is similar.

Note – In newer versions of the top cover, the release button is located closer to the edge of the cover. Except for this difference in location, the release mechanism operates in the same manner in both versions.

FIGURE: Removing the Top Cover



3. **Remove the top cover.**

   Lift up and remove the cover.

Related Information

- "Install the Top Cover" on page 175

Servicing Hard Drives

These topics explain how to remove and install hard drives in Sun SPARC Enterprise T5120 and T5220 servers.

- "Hard Drive Servicing Overview" on page 69
- "Hard Drive LEDs" on page 70
- "Remove a Hard Drive" on page 71
- "Install a Hard Drive" on page 73
- "Four-Drive Capable Backplane Configuration Reference" on page 77
- "Eight-Drive Capable Backplane Configuration Reference" on page 78
- "Sixteen-Drive Capable Backplane Configuration Reference" on page 79

Hard Drive Servicing Overview

Hard drives in Sun SPARC Enterprise T5120 and T5220 servers are capable of being removed and installed while the server is running. This feature, referred to as being *hot-pluggable*, depends on how the hard drives are configured.

Note – Sun SPARC Enterprise T5120 and T5220 servers support both traditional, disk-based storage devices and flash SSDs, diskless storage devices based on solid-state memory. The terms "hard drive" and "HDD" (hard disk drive) are used in a generic sense to refer to both types of internal storage devices.

To hot-plug a drive, you must first take it offline. This prevent applications from accessing it and removes software links to it.

There are two conditions that will prevent a drive from being hot-plugged:

- The hard drive contains the sole image of the operating system -- that is, the operating system is not mirrored on another drive.
- The hard drive cannot be logically isolated from the server's online operations.

If either of these conditions exist, you must power off the server before replacing a hard drive.

Related Information

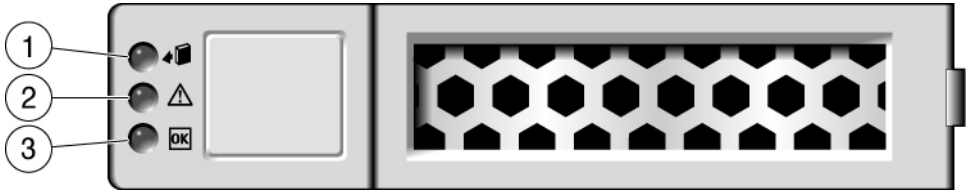
- "Removing Power From the System" on page 60
- "Power Off the Server (Service Processor Command)" on page 60
- "Power Off the Server (Power Button - Graceful)" on page 62
- "Four-Drive Capable Backplane Configuration Reference" on page 77
- "Eight-Drive Capable Backplane Configuration Reference" on page 78
- "Sixteen-Drive Capable Backplane Configuration Reference" on page 79

Hard Drive LEDs

Each hard drive has a group of three status LEDs, as shown in the following figure. Both disk-based hard drives and flash SSDs use the same set of LEDS.

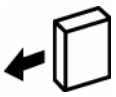
Note – The OK/Activity LED has slightly different behavior for SSDs than for disk-based drives. This difference is described in the table that follows the figure.

FIGURE: Hard Drive LEDs



The following table explains how to interpret the hard drive status LEDs.

TABLE: Status LEDs for Hard Drives

	LED		Color	Description
1	Ready to Remove		Blue	Indicates that a hard drive can be removed during a hot-plug operation.
2	Service Required		Amber	Indicates that the hard drive is has experienced a fault condition.
3	OK/Activity (HDDs)		Green	Indicates the HDD's availability for use. • On -- Drive is idle and available for use. • Off -- Read or write activity is in progress.
3	OK/Activity (SSDs)		Green	Indicates the drive's availability for use. • On -- Drive is idle and available for use. • Off -- Read or write activity is in progress. • Flashes on and off -- This occurs during hot-plug operations. It can be ignored.

Note – The front and rear panel Service Required LEDs are also lit when the system detects a hard drive fault.

▼ Remove a Hard Drive

Removing a hard drive from the server is a three-step process. You must first identify the drive you wish to remove, unconfigure that drive from the server, and then manually remove the drive from the chassis.

1. **At the Solaris prompt, type the** `cfgadm -al` **command. This will list all drives in the device tree, including drives that are not configured.**

```
# cfgadm -al
```

This command should identify the `Ap_id` for the hard drive you plan to remove, as shown below.

```
Ap_id                          Type         Receptacle   Occupant     Condition
c0                             scsi-bus     connected    configured   unknown
c0::dsk/c1t0d0                 disk         connected    configured   unknown
c0::dsk/c1t1d0                 disk         connected    configured   unknown
usb0/1                         unknown      empty        unconfigured ok
usb0/2                         unknown      empty        unconfigured ok
usb0/3                         unknown      empty        unconfigured ok
usb1/1                         unknown      empty        unconfigured ok
usb1/2                         unknown      empty        unconfigured ok
usb1/3                         unknown      empty        unconfigured ok
usb2/1                         unknown      empty        unconfigured ok
usb2/2                         unknown      empty        unconfigured ok
usb2/3                         unknown      empty        unconfigured ok
usb2/4                         unknown      empty        unconfigured ok
usb2/5                         unknown      empty        unconfigured ok
usb2/6                         unknown      empty        unconfigured ok
usb2/7                         unknown      empty        unconfigured ok
usb2/8                         unknown      empty        unconfigured ok
----------------------------
```

2. **Type** `cfgadm -c unconfigure` **to unconfigure the disk.**

For example, the following shows drive c0:dsk/c1t1d1 being unconfigured:

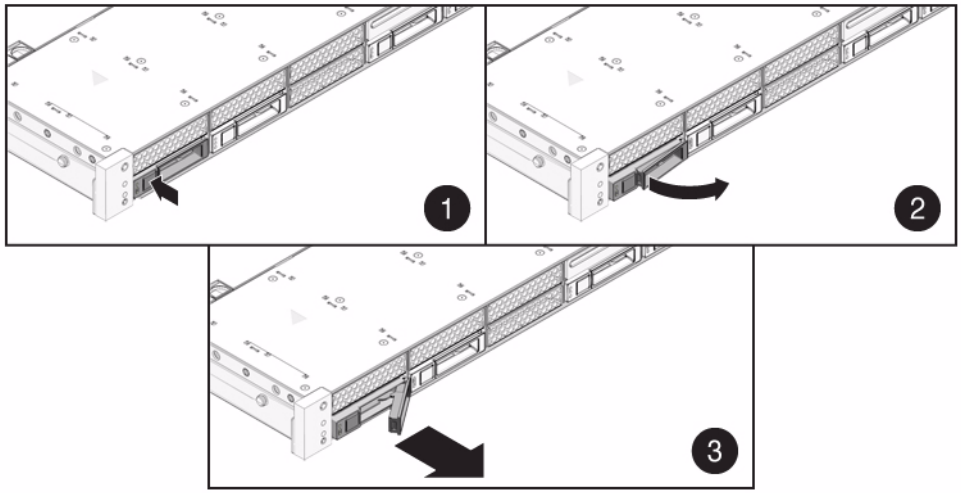
```
# cfgadm -c unconfigure c0::dsk/c1t1d1
```

3. **Wait until the blue Ready-to-Remove LED lights.**

This LED will help you identify which drive is unconfigured and can be removed.

4. **On the drive you plan to remove, push the hard drive release button to open the latch.**

FIGURE: Locating the Hard Drive Release Button and Latch



Caution – The latch is not an ejector. Do not bend the latch too far to the right. Doing so can damage the latch

5. **Grasp the latch and pull the drive out of the drive slot.**

Related Information

- "Install a Hard Drive" on page 73
- "Four-Drive Capable Backplane Configuration Reference" on page 77
- "Eight-Drive Capable Backplane Configuration Reference" on page 78
- "Sixteen-Drive Capable Backplane Configuration Reference" on page 79

▼ Install a Hard Drive

Installing a hard drive into the SPARC Enterprise T5120 and T5220 servers is a two-step process. You must first install a hard drive into the desired drive slot. Then you must configure that drive to the server.

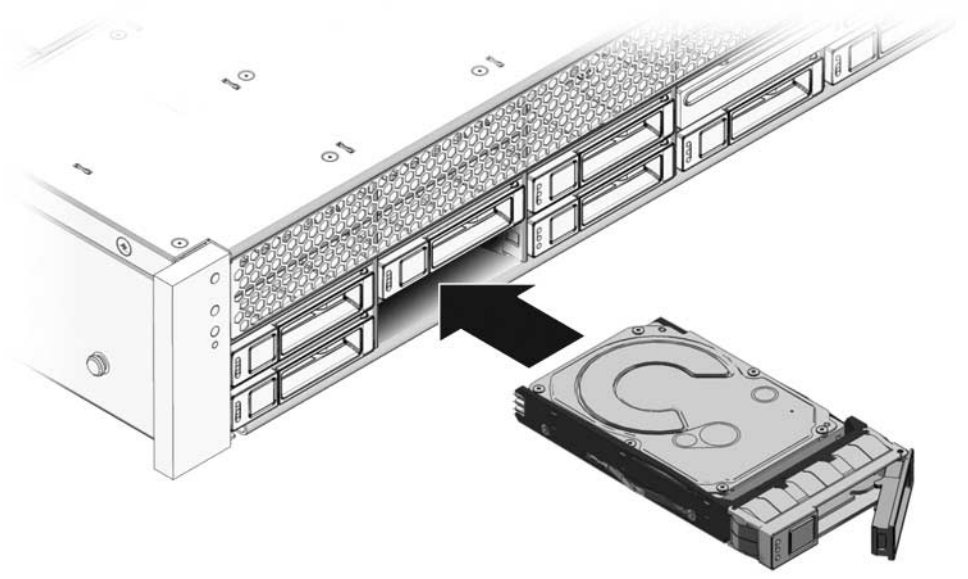
1. **If necessary, remove the blank panel from the chassis.**

Note – Sun SPARC Enterprise T5120 servers might have up to seven blank panels covering unoccupied drive slots. Sun SPARC Enterprise T5220 servers might have as many as fifteen blank panels covering unoccupied hard drive slots.

2. **Align the replacement drive to the drive slot.**

   Hard drives are physically addressed according to the slot in which they are installed. If you install a hard drive as a replacement for a drive that was removed, the new drive must go into the same slot as the drive it is replacing.

FIGURE: Installing a Hard Drive (Illustrating Installation in a Sun SPARC Enterprise T5220 Server)



3. **With the latch open, slide the hard drive into its bay until it is fully seated. Then close the latch to secure the drive.**

4. **At the Solaris prompt, type the `cfgadm -al` command. This will list all drives in the device tree, including drives that are not configured.**

```
# cfgadm -al
```

This command should identify the `Ap_id` for the hard drive you plan to remove, as shown below.

```
Ap_id                          Type         Receptacle   Occupant     Condition
c0                             scsi-bus     connected    configured   unknown
c0::dsk/c1t0d0                 disk         connected    configured   unknown
c0::sd1                        disk         connected    unconfigured unknown
usb0/1                         unknown      empty        unconfigured ok
usb0/2                         unknown      empty        unconfigured ok
usb0/3                         unknown      empty        unconfigured ok
usb1/1                         unknown      empty        unconfigured ok
usb1/2                         unknown      empty        unconfigured ok
usb1/3                         unknown      empty        unconfigured ok
usb2/1                         unknown      empty        unconfigured ok
usb2/2                         unknown      empty        unconfigured ok
usb2/3                         unknown      empty        unconfigured ok
usb2/4                         unknown      empty        unconfigured ok
usb2/5                         unknown      empty        unconfigured ok
usb2/6                         unknown      empty        unconfigured ok
usb2/7                         unknown      empty        unconfigured ok
usb2/8                         unknown      empty        unconfigured ok
----------------------------
```

5. **Type `cfgadm -c configure` command to configure the disk.**

For example, the following shows drive `c0:dsk/c1t1d1` being configured:

```
# cfgadm -c configure c0::sd1
```

where `c0::sd1` is the disk that you want to configure.

6. **Wait until the blue Ready-to-Remove LED is no longer lit on the drive that you installed.**

7. **At the Solaris prompt, type the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured.**

```
# cfgadm -al
```

This command should identify the `Ap_id` for the hard drive that you installed. The output should indicate that the drive you installed is configured. For example, the output should look like this:

```
Ap_id                          Type         Receptacle   Occupant     Condition
c0                             scsi-bus     connected    configured   unknown
c0::dsk/c1t0d0                 disk         connected    configured   unknown
c0::dsk/c1t1d0                 disk         connected    configured   unknown
usb0/1                         unknown      empty        unconfigured ok
usb0/2                         unknown      empty        unconfigured ok
usb0/3                         unknown      empty        unconfigured ok
usb1/1                         unknown      empty        unconfigured ok
usb1/2                         unknown      empty        unconfigured ok
usb1/3                         unknown      empty        unconfigured ok
usb2/1                         unknown      empty        unconfigured ok
usb2/2                         unknown      empty        unconfigured ok
usb2/3                         unknown      empty        unconfigured ok
usb2/4                         unknown      empty        unconfigured ok
usb2/5                         unknown      empty        unconfigured ok
usb2/6                         unknown      empty        unconfigured ok
usb2/7                         unknown      empty        unconfigured ok
usb2/8                         unknown      empty        unconfigured ok
----------------------------
```

Related Information

- "Install a Hard Drive" on page 73
- "Four-Drive Capable Backplane Configuration Reference" on page 77
- "Eight-Drive Capable Backplane Configuration Reference" on page 78
- "Sixteen-Drive Capable Backplane Configuration Reference" on page 79

Four-Drive Capable Backplane Configuration Reference

The following table shows the physical hard drive locations in a four-drive capable backplane.

TABLE: Physical Drive Locations in a Four-Drive Capable Backplane

			DVD	
HDD0	HDD1		HDD2	HDD3

The following table matches the FRU names and the default OpenBoot PROM/Solaris drive pathnames with the physical drive locations in a four-drive capable backplane.

TABLE: Physical Drive Locations, FRU Names, and Default Drive Pathnames for a Four-Drive Capable Backplane

Physical Location	FRU Name	OpenBoot PROM/Solaris Default Drive Pathname
HDD0	/SYS/HDD0	c0::dsk/c1t0d0
HDD1	/SYS/HDD1	c0::dsk/c1t1d0
HDD2	/SYS/HDD2	c0::dsk/c1t2d0
HDD3	/SYS/HDD3	c0::dsk/c1t3d0
DVD	/SYS/DVD	

Related Information

- "Install a Hard Drive" on page 73
- "Remove a Hard Drive" on page 71
- "Eight-Drive Capable Backplane Configuration Reference" on page 78
- "Sixteen-Drive Capable Backplane Configuration Reference" on page 79

Eight-Drive Capable Backplane Configuration Reference

The first table below identifies the hard drive slot numbering in an eight-drive capable backplane.

The second table matches the FRU names and the default OpenBoot PROM/Solaris drive pathnames with the physical drive locations in an eight-drive capable backplane.

TABLE: Physical Drive Locations in an Eight-Drive Capable Backplane

HDD1	HDD3	HDD5	DVD	
HDD0	HDD2	HDD4	HDD6	HDD7

TABLE: Physical Drive Locations, FRU Names, and Default Drive Pathnames for an Eight-Drive Capable Backplane

Physical Location	FRU Name	OpenBoot PROM/Solaris Default Drive Pathname
HDD0	/SYS/HDD0	c0::dsk/c1t0d0
HDD1	/SYS/HDD1	c0::dsk/c1t1d0
HDD2	/SYS/HDD2	c0::dsk/c1t2d0
HDD3	/SYS/HDD3	c0::dsk/c1t3d0
HDD4	/SYS/HDD4	c0::dsk/c1t4d0
HDD5	/SYS/HDD5	c0::dsk/c1t5d0
HDD6	/SYS/HDD6	c0::dsk/c1t6d0
HDD7	/SYS/HDD7	c0::dsk/c1t7d0
DVD	/SYS/DVD	

Related Information

- "Install a Hard Drive" on page 73
- "Remove a Hard Drive" on page 71
- "Four-Drive Capable Backplane Configuration Reference" on page 77
- "Sixteen-Drive Capable Backplane Configuration Reference" on page 79

Sixteen-Drive Capable Backplane Configuration Reference

The first table below identifies the hard drive slot numbering in a sixteen-disk capable backplane.

The second table matches the FRU names and the default OpenBoot PROM/Solaris drive pathnames with the physical drive locations.

TABLE: Physical Drive Locations in a Sixteen-Disk Capable Backplane

HDD3	HDD7		HDD12	HDD15
HDD2	HDD6		HDD11	HDD14
HDD1	HDD5	HDD9	DVD	
HDD0	HDD4	HDD8	HDD10	HDD13

TABLE: Physical Drive Locations, FRU Addresses, and Default Drive Pathnames for a Sixteen-Disk Capable Backplane

Physical Location	FRU Address	OpenBoot PROM/Solaris Default Drive Pathname
HDD0	/SYS/HDD0	c0::dsk/c1t0d0
HDD1	/SYS/HDD1	c0::dsk/c1t1d0
HDD2	/SYS/HDD2	c0::dsk/c1t2d0
HDD3	/SYS/HDD3	c0::dsk/c1t3d0
HDD4	/SYS/HDD4	c0::dsk/c1t4d0
HDD5	/SYS/HDD5	c0::dsk/c1t5d0
HDD6	/SYS/HDD6	c0::dsk/c1t6d0
HDD7	/SYS/HDD7	c0::dsk/c1t7d0
HDD8	/SYS/HDD8	c0::dsk/c1t8d0
HDD9	/SYS/HDD9	c0::dsk/c1t9d0
HDD10	/SYS/HDD10	c0::dsk/c1t10d0
HDD11	/SYS/HDD11	c0::dsk/c1t11d0
HDD12	/SYS/HDD12	c0::dsk/c1t12d0
HDD13	/SYS/HDD13	c0::dsk/c1t13d0

TABLE: Physical Drive Locations, FRU Addresses, and Default Drive Pathnames for a Sixteen-Disk Capable Backplane *(Continued)*

Physical Location	FRU Address	OpenBoot PROM/Solaris Default Drive Pathname
HDD14	/SYS/HDD14	c0::dsk/c1t14d0
HDD15	/SYS/HDD15	c0::dsk/c1t15d0
DVD	/SYS/DVD	

Related Information

- "Install a Hard Drive" on page 73
- "Remove a Hard Drive" on page 71
- "Four-Drive Capable Backplane Configuration Reference" on page 77
- "Eight-Drive Capable Backplane Configuration Reference" on page 78

Servicing Motherboard Components

These topics explain how to replace the motherboard and its components in the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers.

- "Servicing FB-DIMMs" on page 81
- "Servicing the Air Duct" on page 100
- "Servicing PCIe/XAUI Risers" on page 102
- "Servicing the Battery" on page 112
- "Servicing the SCC Module" on page 114
- "Servicing the Motherboard Assembly" on page 117

Related Information

- "Infrastructure Boards in SPARC Enterprise T5120 Servers" on page 2

Servicing FB-DIMMs

These topics explain how to identify, locate, and replace faulty FB-DIMMs. They also describe procedures for upgrading memory capacity and provide guidelines for achieving and maintaining valid memory configurations.

- "Memory Fault Handling Overview" on page 82
- "Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83
- "Identify Faulty FB-DIMMs Using the FB-DIMM Fault Locator Button" on page 83
- "Remove FB-DIMMs" on page 85
- "Install Replacement FB-DIMMs" on page 87
- "Verify Successful Replacement of Faulty FB-DIMMs" on page 89
- "Upgrade Memory Configuration With Additional FB-DIMMs" on page 91
- "FB-DIMM Configuration Guidelines" on page 95
- "FB-DIMM Configuration Reference" on page 96

Memory Fault Handling Overview

A variety of features play a role in how the memory subsystem is configured and how memory faults are handled. Understanding the underlying features helps you identify and repair memory problems.

The following server features manage memory faults:

- **POST** – By default, POST runs when the server is powered on.

  For correctable memory errors (CEs), POST forwards the error to the Solaris Predictive Self-Healing (PSH) daemon for error handling. If an uncorrectable memory fault is detected, POST displays the fault with the device name of the faulty FB-DIMMs, and logs the fault. POST then disables the faulty FB-DIMMs. Depending on the memory configuration and the location of the faulty FB-DIMM, POST disables half of physical memory in the system, or half the physical memory and half the processor threads. When this offlining process occurs in normal operation, you must replace the faulty FB-DIMMs based on the fault message and enable the disabled FB-DIMMs with the ILOM command `set` *device* `component_state=enabled` where *device* is the name of the FB-DIMM being enabled (for example, `set /SYS/MB/CMP0/BR0/CH0/D0 component_state=enabled`).

- **Solaris Predictive Self-Healing (PSH) technology** – PSH uses the Fault Manager daemon (`fmd`) to watch for various kinds of faults. When a fault occurs, the fault is assigned a unique fault ID (UUID), and logged. PSH reports the fault and suggests a replacement for the FB-DIMMs associated with the fault.

If you suspect the server has a memory problem, run the ILOM `show faulty` command. This command lists memory faults and identifies the FB-DIMM modules associated with the fault.

Related Information

- "POST Overview" on page 35
- "Solaris PSH Feature Overview" on page 44
- "PSH-Detected Fault Console Message" on page 45
- "Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83
- "Identify Faulty FB-DIMMs Using the FB-DIMM Fault Locator Button" on page 83

▼ Identify Faulty FB-DIMMs Using the `show faulty` Command

The ILOM `show faulty` command displays current system faults, including FB-DIMM failures.

- **Enter `show faulty` at the `->` prompt.**

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+------------------------------
/SP/faultmgmt/0      | fru                     | /SYS/MB/CMP0/BR1/CH0/D0
/SP/faultmgmt/0      | timestamp               | Dec 21 16:40:56
/SP/faultmgmt/0/     | timestamp               | Dec 21 16:40:56 faults/0
/SP/faultmgmt/0/     | sp_detected_fault       | /SYS/MB/CMP0/BR1/CH0/D0
faults/0             |                         | Forced fail(POST)
```

Related Information

- "Identify Faulty FB-DIMMs Using the FB-DIMM Fault Locator Button" on page 83

▼ Identify Faulty FB-DIMMs Using the FB-DIMM Fault Locator Button

Use the FB-DIMM Fault Locator button to identify faulty FB-DIMMs.

Note – The location of this button is shown in FIGURE: FB-DIMM Fault Locator Button on the Motherboard on page 84. It is marked *SW6500*.

---

1. **Extend the server to the maintenance position.**

   See "Extend the Server to the Maintenance Position" on page 63.

2. **Disconnect power from the server.**

   See "Removing Power From the System" on page 60.

3. **Remove the top cover.**

   See "Remove the Top Cover" on page 67.

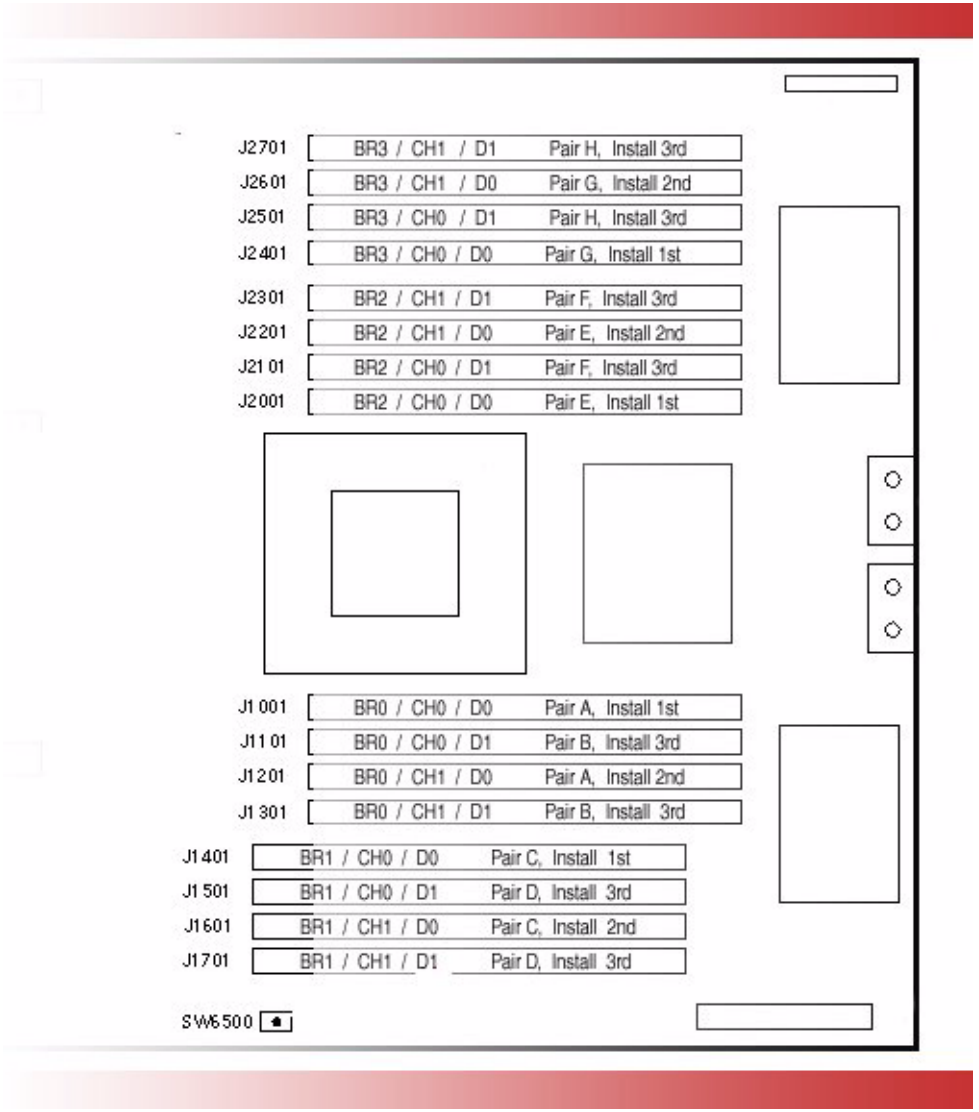
4. **Open the air duct to gain to access the FB-DIMM Fault Locator button.**

5. **Press the FB-DIMM Fault Locator button on the motherboard.**

   This will cause an amber LED associated with the faulty FB-DIMM to light for a few minutes.

Note – The FB-DIMM Fault Locator button is near the left edge of the motherboard (as viewed from the front panel). It has the label *SW6500* in the following figure.

FIGURE: FB-DIMM Fault Locator Button on the Motherboard


J2701 BR3 / CH1 / D1 Pair H, Install 3rd
J2601 BR3 / CH1 / D0 Pair G, Install 2nd
J2501 BR3 / CH0 / D1 Pair H, Install 3rd
J2401 BR3 / CH0 / D0 Pair G, Install 1st
J2301 BR2 / CH1 / D1 Pair F, Install 3rd
J2201 BR2 / CH1 / D0 Pair E, Install 2nd
J2101 BR2 / CH0 / D1 Pair F, Install 3rd
J2001 BR2 / CH0 / D0 Pair E, Install 1st
J1001 BR0 / CH0 / D0 Pair A, Install 1st
J1101 BR0 / CH0 / D1 Pair B, Install 3rd
J1201 BR0 / CH1 / D0 Pair A, Install 2nd
J1301 BR0 / CH1 / D1 Pair B, Install 3rd
J1401 BR1 / CH0 / D0 Pair C, Install 1st
J1501 BR1 / CH0 / D1 Pair D, Install 3rd
J1601 BR1 / CH1 / D0 Pair C, Install 2nd
J1701 BR1 / CH1 / D1 Pair D, Install 3rd
SW6500

6. **Note the FB-DIMM next to the illuminated LED.**
7. **Ensure that all other FB-DIMMs are seated correctly in their slots.**

Related Information

- "Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83

▼ Remove FB-DIMMs

Before beginning this procedure, ensure that you are familiar with the cautions and safety instructions described in "General Safety Information" on page 57.

Caution – Do not leave FB-DIMM slots empty. You must install filler panels in all empty FB-DIMM slots.

1. **Extend the server to the maintenance position.**

   See "Extend the Server to the Maintenance Position" on page 63.

2. **Remove power from the server.**

   See "Disconnect Power Cords From the Server" on page 62.

3. **Remove the top cover.**

   See "Remove the Top Cover" on page 67.

4. **(Sun SPARC Enterprise T5120 server, 8-drive capable) Disconnect and stow the hard drive data cable:**

   a. **Unplug the hard drive data cable from J6401 on the motherboard.**

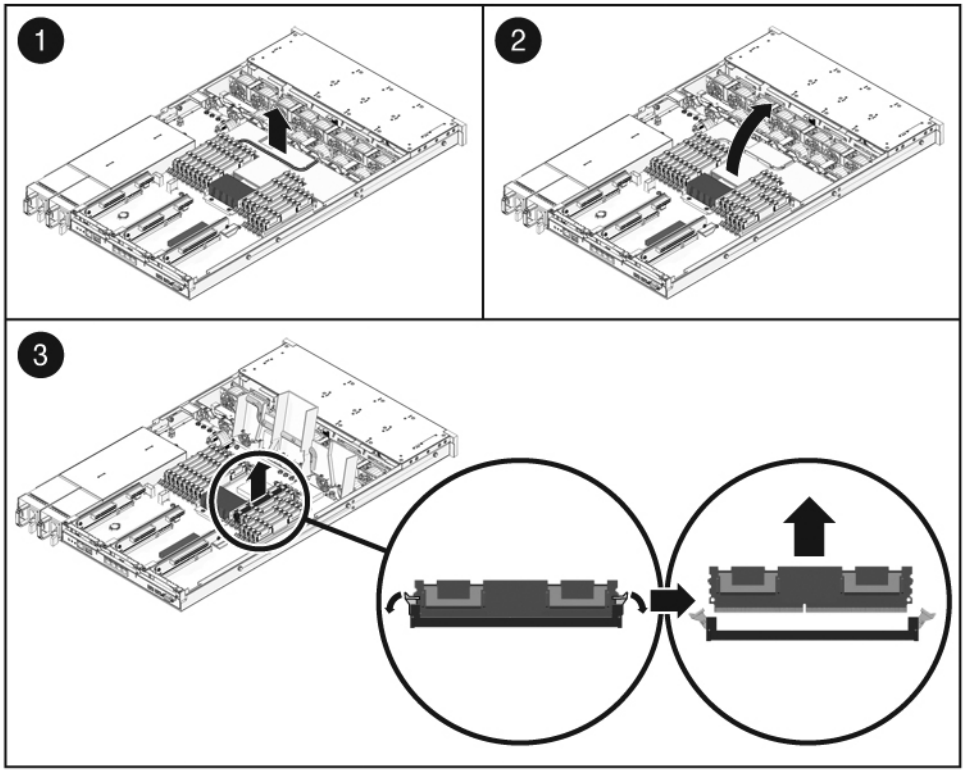
   b. **Remove the hard drive data cable from its seat on the CMP air duct.**

   c. **Place the hard drive cable end out of the way of the air duct.**

5. **Rotate the air duct up and toward the front of the system.**

   See panels 1 and 2 of the following figure.

FIGURE: Removing FB-DIMMs



6. **Press the Fault Locator button on the motherboard to identify the FB-DIMMs that need to be replaced.**

Tip – Make a note of the faulty FB-DIMM location.

Note – For memory configuration information, see "FB-DIMM Configuration Guidelines" on page 95.

---

7. **Push down on the ejector tabs on each side of the FB-DIMM until the FB-DIMM is released.See** FIGURE: Removing FB-DIMMs on page 86**.**

   See panel 3 in the preceding figure.

Caution – FB-DIMMs and heat sinks on the motherboard may be hot.

---

8. **Grasp the top corners of the faulty FB-DIMM and lift it out of its slot.**

9. **Place the FB-DIMM on an antistatic mat.**
10. **Repeat Step 7 through Step 9 for any other FB-DIMMs you intend to remove.**
11. **If you do not plan to install replacement FB-DIMMs at this time, install filler panels in the empty slots.**

Related Information

- "Install Replacement FB-DIMMs" on page 87
- "Verify Successful Replacement of Faulty FB-DIMMs" on page 89

▼ Install Replacement FB-DIMMs

Before beginning this procedure, ensure that you are familiar with the information provided in these topics:

- "Preparing to Service the System" on page 57
- "FB-DIMM Configuration Guidelines" on page 95

Note – If the server is already extended and open, begin the procedure at Step 4.

---

1. **Extend the server to the maintenance position.**

   See "Extend the Server to the Maintenance Position" on page 63

2. **Remove power from the server.**

   See "Disconnect Power Cords From the Server" on page 62

3. **Remove the top cover.**

   See "Remove the Top Cover" on page 67

4. **(Sun SPARC Enterprise server; 8-drive capable) Disconnect and stow the hard drive data cable:**

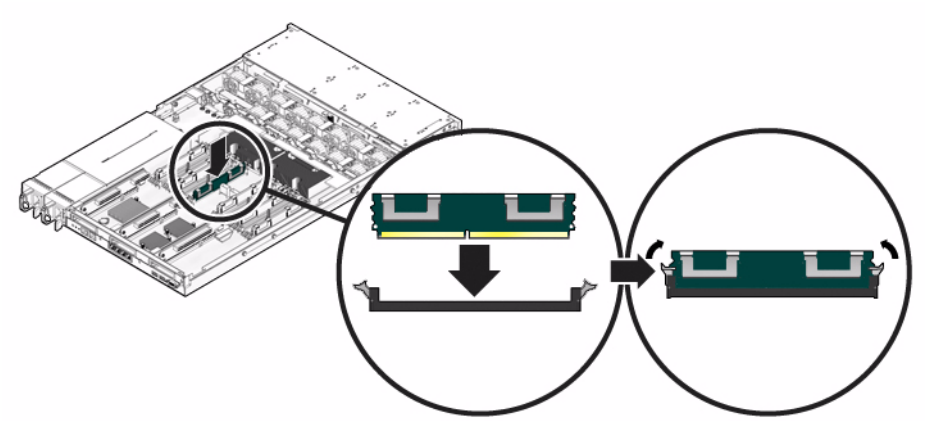
   a. **Unplug the hard drive data cable from J6401 on the motherboard.**

   b. **Remove the hard drive data cable from its seat on the CMP air duct.**

   c. **Place the hard drive cable end out of the way of the air duct.**

5. **Unpackage the replacement FB-DIMMs and place them on an antistatic mat.**
6. **Ensure that the ejector tabs on the connector that will receive the FB-DIMM are in the open position.**

FIGURE: Installing FB-DIMMs



7. **Align the FB-DIMM notch with the key in the connector.**

Caution – Ensure that the orientation is correct. The FB-DIMM might be damaged if the orientation is reversed.

---

8. **Push the FB-DIMM into the connector until the ejector tabs lock the FB-DIMM in place.**

   If the FB-DIMM does not easily seat into the connector, verify the FB-DIMM orientation.

9. **Repeat** Step 6 **through** Step 8 **until all new FB-DIMMs are installed.**

10. **(SPARC Enterprise T5120 servers) Reconnect the hard drive cable.**

    a. **Route the hard drive data cable over the fan module and along the air duct.**

    b. **Plug the data cable into J6401 on the motherboard.**

11. **Install the top cover.**

    See "Install the Top Cover" on page 175.

12. **Slide the server into the rack.**

    See "Reinstall the Server in the Rack" on page 176.

13. **Connect the power cords.**

    See ."Connect Power Cords to the Server" on page 178.

Note – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

Related Information

- "Remove FB-DIMMs" on page 85
- "Verify Successful Replacement of Faulty FB-DIMMs" on page 89

▼ Verify Successful Replacement of Faulty FB-DIMMs

1. **Access the ILOM `->` prompt.**

   Refer to the *Sun Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun SPARC Enterprise T5120 and T5220 Servers* for instructions.

2. **Use the `show faulty` command to determine how to clear the fault.**
   - If `show faulty` indicates a POST-detected the fault go to Step 3.
   - If `show faulty` indicates a host-detected fault (output displays a UUID), go directly to Step 4.

3. **Use the `set` command to enable the FB-DIMM that was disabled by POST.**

   In most cases, replacement of a faulty FB-DIMM is detected when the service processor is power cycled. In those cases, the fault is automatically cleared from the system. If `show faulty` still displays the fault, clear it with the `set` command.

```
-> set /SYS/MB/CMP0/BR0/CH0/D0 component_state=Enabled
```

4. **Perform the following steps to verify the repair:**

   a. **Set the virtual keyswitch to `diag` so that POST will run in Service mode.**

```
-> set /SYS/keyswitch_state=Diag
Set 'keyswitch_state' to 'Diag'
```

   b. **Power cycle the system.**

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
```

```
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – The server takes about one minute to power off. Use the `show /HOST` command to determine when the host has been powered off. The console will display `status=Powered Off`.

c. Switch to the system console to view POST output.

Watch the POST output for possible fault messages. The following output indicates that POST did not detect any faults:

```
-> start /SYS/console
.
.
.
0:0:0>INFO:
0:0:0>     POST Passed all devices.
0:0:0>POST:    Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note – Depending on the configuration of ILOM POST variables and whether POST detected faults or not, the system might boot, or the system might remain at the `ok` prompt. If the system is at the `ok` prompt, type `boot`.

d. Return the virtual keyswitch to Normal mode.

```
-> set /SYS keyswitch_state=Normal
Set 'ketswitch_state' to 'Normal'
```

e. Switch to the system console and type the Solaris OS `fmadm faulty` command.

```
# fmadm faulty
```

No memory faults should be displayed.

If faults are reported, refer to the diagnostics instructions described in "ILOM Troubleshooting Overview" on page 23 for guidance in troubleshooting the fault.

5. Switch to the ILOM command shell.

6. **Run the** `show faulty` **command.**

```
-> show faulty
Target               | Property                | Value
---------------------+-------------------------+------------------------------
/SP/faultmgmt/0      | fru                     | /SYS/MB/CMP0/BR0/CH1/D0
/SP/faultmgmt/0      | timestamp               | Dec 14 22:43:59
/SP/faultmgmt/0/     | sunw-msg-id             | SUN4V-8000-DX
faults/0             |                         |
/SP/faultmgmt/0/     | uuid                    | 3aa7c854-9667-e176-efe5-e487e520
faults/0             |                         | 7a8a
/SP/faultmgmt/0/     | timestamp               | Dec 14 22:43:59
faults/0             |                         |
```

If the `show faulty` command reports a fault with a UUID go on to Step 7. If `show faulty` does *not* report a fault with a UUID, you are done with the verification process.

7. **Switch to the system console and type the** `fmadm repair` **command with the UUID.**

Use the same UUID that was displayed from the output of the ILOM `show faulty` command.

```
# fmadm repair 3aa7c854-9667-e176-efe5-e487e520
```

Related Information

- "Remove FB-DIMMs" on page 85
- "Install Replacement FB-DIMMs" on page 87
- "Upgrade Memory Configuration With Additional FB-DIMMs" on page 91
- "FB-DIMM Configuration Guidelines" on page 95

▼ Upgrade Memory Configuration With Additional FB-DIMMs

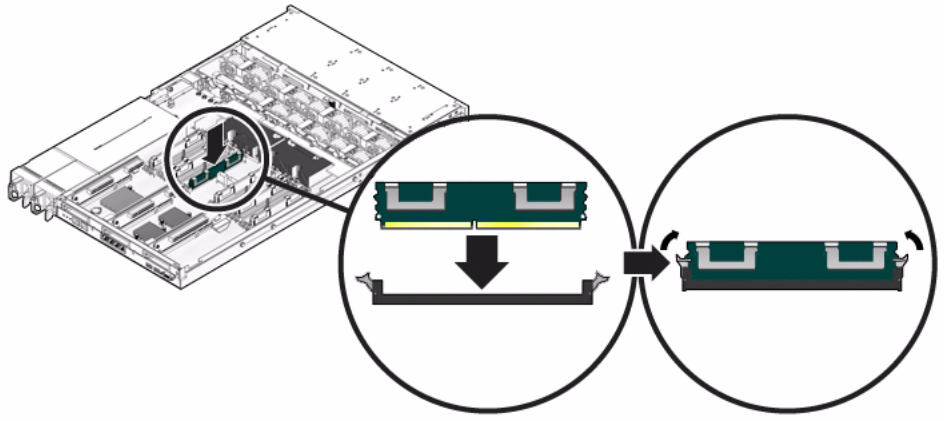
Before you begin this memory upgrade procedure, become familiar with the memory configuration guidelines described in "FB-DIMM Configuration Guidelines" on page 95.

Caution – Ensure that all power is removed from the server before installing FB-DIMMs or damage to the FB-DIMMs might occur.

Caution – You must disconnect the power cables from the system before performing this procedure.

1. **Unpack the replacement FB-DIMMs and place them on an antistatic mat.**
2. **(SPARC Enterprise T5120. 8-drive capable server) Disconnect and stow the hard drive data cable.**
   a. **Unplug the hard drive data cable from J6401 on the motherboard.**
   b. **Remove the hard drive data cable from its seat on the CMP air duct.**
   c. **Place the hard drive cable end out of the way of the air duct.**
3. **Rotate the air duct up and toward the front of the system.**
4. **Remove any filler panels from the FB-DIMM slots, if necessary.**
   Store the filler panels in a safe place. You will reuse the filler panels if you remove FB-DIMMs in the future.
5. **Ensure that the ejector tabs are in the open position.**
6. **Line up the FB-DIMM with the connector.**
   Align the FB-DIMM notch with the key in the connector. This alignment ensures that the FB-DIMM is oriented correctly.
7. **Push the FB-DIMM into the connector until the ejector tabs lock the FB-DIMM in place.**

FIGURE: Installing FB-DIMMs



Note – If the FB-DIMM does not easily seat into the connector, it may not have the correct orientation. If the orientation is reversed, damage to the FB-DIMM might occur.

8. **Repeat Step 5 through Step 7 until all FB-DIMMs are installed.**
9. **Rotate the air duct back into its operating position.**

   The air duct snaps into position above the CMP and memory modules.
10. **(Sun SPARC Enterprise server, 8-drive capable) Reconnect the hard drive data cable.**

    a. **Route the hard drive data cable over the fan module and along the air duct.**

    b. **Plug the data cable into J6401 on the motherboard.**
11. **Install the top cover.**

    See "Install the Top Cover" on page 175.
12. **Slide the server into the rack.**

    See "Reinstall the Server in the Rack" on page 176.
13. **Connect the power supplies.**

    See "Connect Power Cords to the Server" on page 178.

Note – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

14. **Power on the server.**

    See "Power On the Server Using the `poweron` Command" on page 179 or "Power On the Server Using the Front Panel Power Button" on page 180.
15. **Perform the following steps to verify that there are no faults:**

    a. **Set the virtual keyswitch to `diag` so that POST will run in Service mode.**

```
-> set /SYS/keyswitch_state=Diag
Set 'keyswitch_state' to 'Diag'
```

    b. **Power cycle the system.**

```
-> stop /SYS
Are you sure you want to stop /SYS (y/n)? y
Stopping /SYS
```

```
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Note – The server takes about one minute to power off. The ILOM console does not indicate when the system is actually powered off.

c. Switch to the system console to view POST output.

```
-> start /SYS/console
```

Watch the POST output for possible fault messages. The following output is a sign that POST did not detect any faults:

```
.
.
.
0:0:0>INFO:
0:0:0>     POST Passed all devices.
0:0:0>POST:    Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note – Depending on the configuration of ILOM POST variables and whether POST detected faults or not, the system might boot, or the system might remain at the `ok` prompt. If the system is at the `ok` prompt, type `boot`.

d. Return the virtual keyswitch to Normal mode.

```
-> set /SYS keyswitch_state=Normal
Set 'ketswitch_state' to 'Normal'
```

Related Information

- "Remove FB-DIMMs" on page 85
- "Install Replacement FB-DIMMs" on page 87
- "Verify Successful Replacement of Faulty FB-DIMMs" on page 89
- "FB-DIMM Configuration Guidelines" on page 95

FB-DIMM Configuration Guidelines

Use the guidelines described in this topic when installing, upgrading, or replacing FB-DIMMs:

- There are a total of 16 slots that support industry-standard FB-DIMMs.
- Supported FB-DIMM capacities are 1 GByte, 2 GByte, 4 GByte, and 8 GByte.
- Valid quantities of FB-DIMMs are 4, 8, or 16.
- All FB-DIMMs in the server must be the same capacity.
- All FB-DIMMs in a branch must have the same part number.

Note – FB-DIMMs that run on 1.5V are not supported in this server. An FB-DIMM that runs on 1.5V is sometimes noted with an LV on the part number label. Do not install such FB-DIMMs in this server.

Guidelines for Upgrading Memory

When adding memory to the server, ensure that you follow all of the guidelines described in this topic.

You might need to relocate some of the original FB-DIMMs to ensure that all FB-DIMMs in a branch have the same part number.

When Replacing Faulty FB-DIMMs

Ensure that the replacement FB-DIMM has the same part number as the FB-DIMM you are removing.

If you are unable to obtain an FB-DIMM with the same part number, you might need to replace all the FB-DIMMs in the branch to ensure that all have the same part number.

Related Information

- "Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83
- "Remove FB-DIMMs" on page 85
- "Install Replacement FB-DIMMs" on page 87
- "Verify Successful Replacement of Faulty FB-DIMMs" on page 89
- "Upgrade Memory Configuration With Additional FB-DIMMs" on page 91

FB-DIMM Configuration Reference

The following figure illustrates the physical arrangement of FB-DIMM slots on the motherboard.

FIGURE: FB-DIMM Slot Layout on the Motherboard

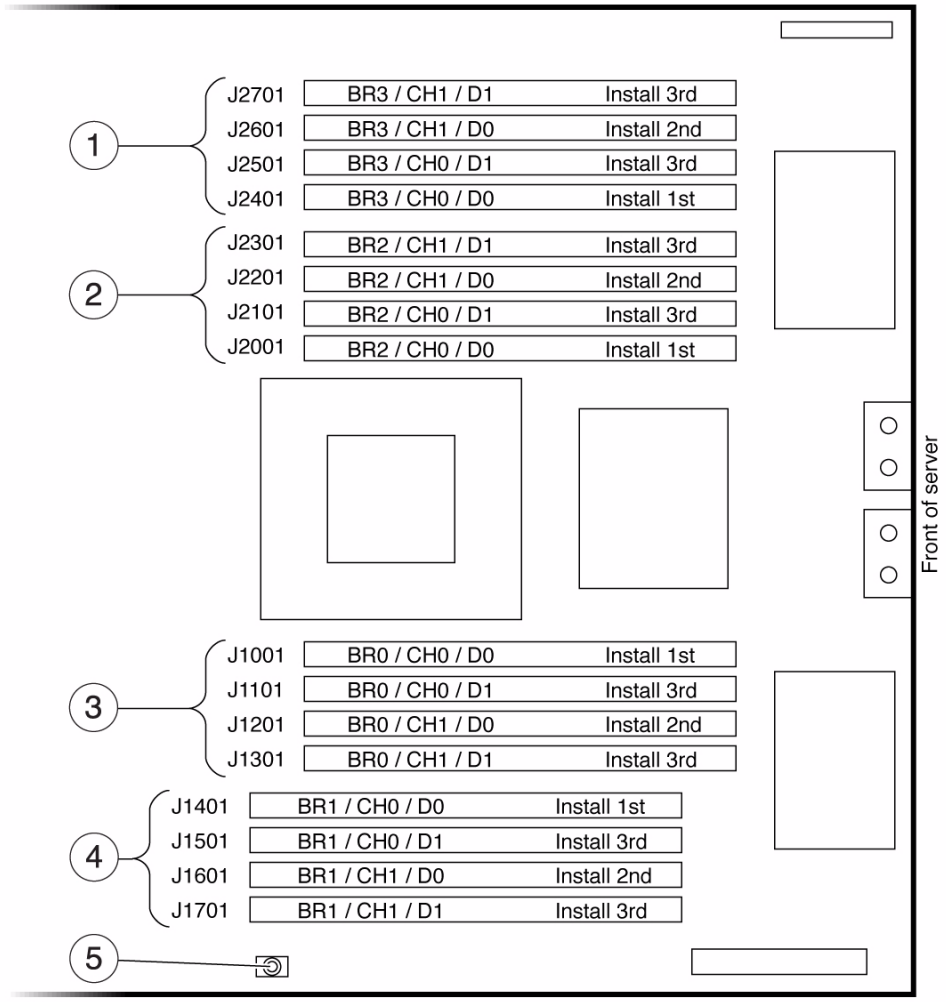

1
J2701 BR3 / CH1 / D1 Install 3rd
J2601 BR3 / CH1 / D0 Install 2nd
J2501 BR3 / CH0 / D1 Install 3rd
J2401 BR3 / CH0 / D0 Install 1st
2
J2301 BR2 / CH1 / D1 Install 3rd
J2201 BR2 / CH1 / D0 Install 2nd
J2101 BR2 / CH0 / D1 Install 3rd
J2001 BR2 / CH0 / D0 Install 1st
Front of server
3
J1001 BR0 / CH0 / D0 Install 1st
J1101 BR0 / CH0 / D1 Install 3rd
J1201 BR0 / CH1 / D0 Install 2nd
J1301 BR0 / CH1 / D1 Install 3rd
4
J1401 BR1 / CH0 / D0 Install 1st
J1501 BR1 / CH0 / D1 Install 3rd
J1601 BR1 / CH1 / D0 Install 2nd
J1701 BR1 / CH1 / D1 Install 3rd
5

Figure Legend

1	Branch 3 FB-DIMM slots
2	Branch 2 FB-DIMM slots
3	Branch 0 FB-DIMM slots
4	Branch 1 FB-DIMM slots
5	FB-DIMM fault locator button
	Note: Pressing the fault locator button causes the LED next to any faulty FB-DIMM to turn on.
	For Each FB-DIMM slot: BR = Branch, CH = Channel, D = DIMM

The following table maps FB-DIMM locations with FB-DIMM FRU names. The FRU name is displayed in memory faults. Use this table to identify the motherboard location of an FB-DIMM FRU name.

TABLE: FB-DIMM Installation Map

Branch Name	Channel Name	FRU Name	Motherboard FB-DIMM Connector	FB-DIMM Installation Order
Branch 3	Channel 1	/SYS/MB/CMP0/BR3/CH1/D1	J2701	3
		/SYS/MB/CMP0/BR3/CH1/D0	J2601	2
	Channel 0	/SYS/MB/CMP0/BR3/CH0/D1	J2501	3
		/SYS/MB/CMP0/BR3/CH0/D0	J2401	1
Branch 2	Channel 1	/SYS/MB/CMP0/BR2/CH1/D1	J2301	3
		/SYS/MB/CMP0/BR2/CH1/D0	J2201	2
	Channel 0	/SYS/MB/CMP0/BR2/CH0/D1	J2101	3
		/SYS/MB/CMP0/BR2/CH0/D0	J2001	1
Branch 0	Channel 0	/SYS/MB/CMP0/BR0/CH0/D0	J1001	1
		/SYS/MB/CMP0/BR0/CH0/D1	J1101	3
	Channel 1	/SYS/MB/CMP0/BR0/CH1/D0	J1201	2
		/SYS/MB/CMP0/BR0/CH1/D1	J1301	3
Branch 1	Channel 0	/SYS/MB/CMP0/BR1/CH0/D0	J1401	1
		/SYS/MB/CMP0/BR1/CH0/D1	J1501	3
	Channel 1	/SYS/MB/CMP0/BR1/CH1/D0	J1601	2
		/SYS/MB/CMP0/BR1/CH1/D1	J1701	3

The following figure shows the order in which FB-DIMM slots must be used for the three level of FB-DIMM quantities.

FIGURE: Slot Use Map for Quantities of 4, 8, and 16 FB-DIMMs

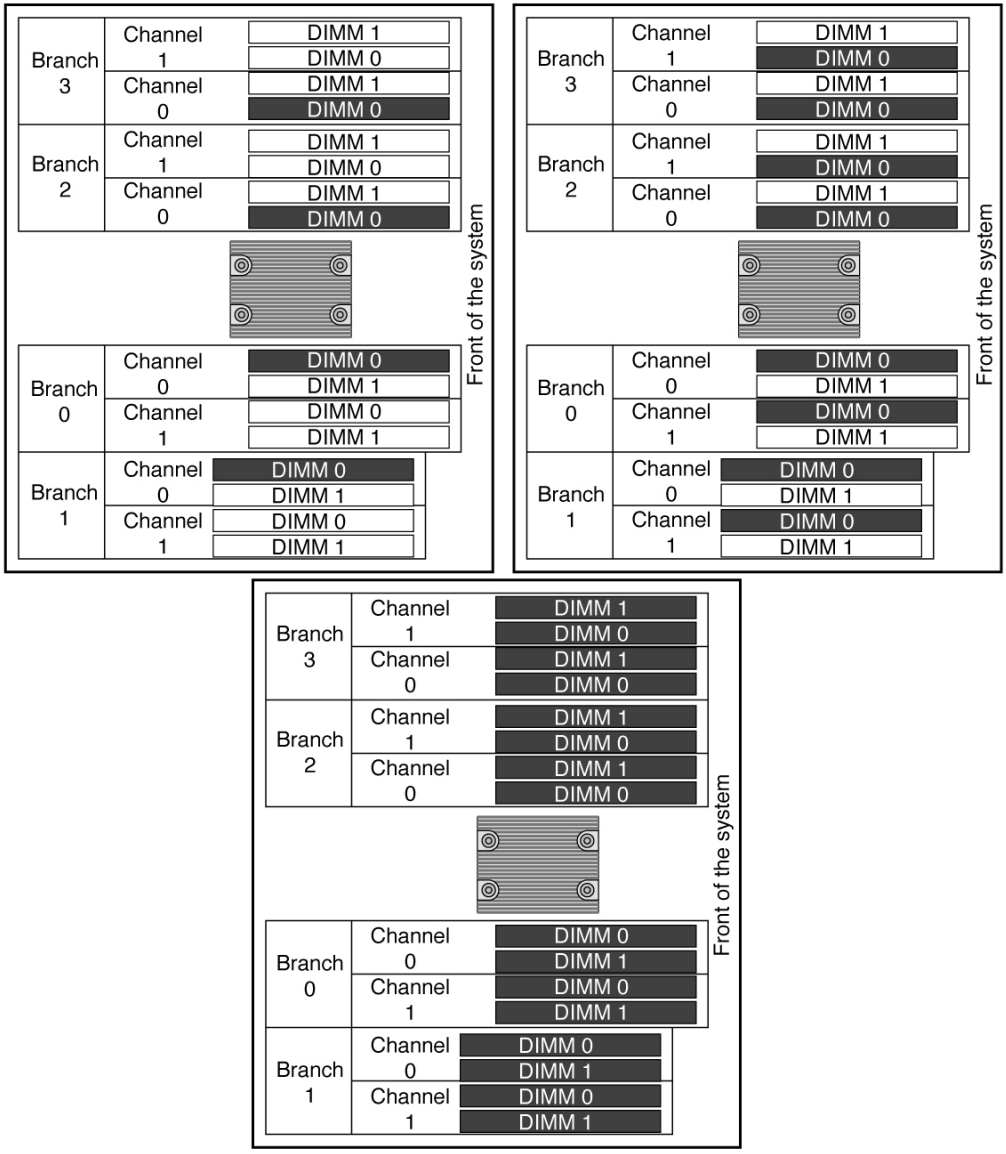


Figure Legend

1	4 FB-DIMM configuration
2	8 FB-DIMM configuration
3	16 FB-DIMM configuration

Related Information

- "Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83
- "Remove FB-DIMMs" on page 85
- "Install Replacement FB-DIMMs" on page 87
- "Verify Successful Replacement of Faulty FB-DIMMs" on page 89
- "Upgrade Memory Configuration With Additional FB-DIMMs" on page 91

Servicing the Air Duct

These topics explain how to remove and replace the air duct.

- "Remove the Air Duct" on page 100
- "Install the Air Duct" on page 101

▼ Remove the Air Duct

You must remove the air duct before removing or installing the following components:

- Power distribution board
- Power supply backplane (SPARC Enterprise T5220)
- Fan module boards
- Paddle card
- Hard drive cage
- Hard drive backplane
- Motherboard

Caution – To prevent the system from overheating, ensure that the air duct is correctly installed before powering on the server.

1. **Slide the system out of the rack.**

   See "Extend the Server to the Maintenance Position" on page 63.

2. **Remove the top cover.**

   See "Remove the Top Cover" on page 67

3. **(Sun SPARC Enterprise T5120 server; 8 drive-capable) Disconnect and stow the hard drive data cable.**

   a. **Unplug the hard drive data cable from J6401 on the motherboard.**

   b. **Remove the hard drive data cable from its seat on the CPU air duct.**

   c. **Place the hard drive cable end out of the way of the air duct.**

4. **Open the air duct.**

   Disengage the rear of the air duct from the motherboard and rotate the air duct forward.

5. **Press in the edges of the air duct to disengage its pins from the chassis.**

6. **Set the air duct aside.**

Related Information

- "Install the Air Duct" on page 101
- "Remove the Top Cover" on page 67

▼ Install the Air Duct

Caution – When the server is in operation, ensure that the air duct is correctly installed to prevent the system from overheating.

1. **Use the guide pins to align and install the air duct into the chassis.**

2. **Rotate the air duct down until it is seated on the motherboard.**

3. **(Sun SPARC Enterprise T5120 server; 8 drive-capable) Reconnect the hard drive data cable.**

   a. **Route the hard drive data cable over the fan module and along the air duct.**

   b. **Plug the data cable into J6401 on the motherboard.**

4. **Install the top cover.**

   See "Install the Top Cover" on page 175 for instructions.

Related Information

- "Install the Top Cover" on page 175
- "Remove the Air Duct" on page 100

Servicing PCIe/XAUI Risers

These topics explain how to service the riser units that support PCIe and XAUI cards and how to remove and install the I/O cards themselves.

- "PCIe/XAUI Riser Overview" on page 102
- "Remove a PCIe/XAUI Riser" on page 102
- "Install a PCIe/XAUI Riser" on page 104
- "Remove a PCIe or XAUI Card" on page 106
- "Install a PCIe or XAUI Card" on page 107
- "PCIe/XAUI Card Configuration Reference for Sun SPARC Enterprise T5120 Servers" on page 110
- "PCIe and XAUI Card Reference for Sun SPARC Enterprise T5220 Servers" on page 111

PCIe/XAUI Riser Overview

PCIe/XAUI cards are installed on vertical risers. You must remove the PCI cross beam and relevant riser to access a PCIe/XAUI card.

Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail.

Caution – Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

You must remove PCIe riser 2 when servicing the SCC module.

You must remove all three PCIe/XAUI risers when servicing the motherboard.

▼ Remove a PCIe/XAUI Riser

1. **Power off the server.**

   See "Removing Power From the System" on page 60.

2. **Disconnect all power cables.**

   See "Disconnect Power Cords From the Server" on page 62"Disconnect Power Cords From the Server" on page 62.

3. **Attach an antistatic wrist strap.**

4. **Disconnect any data cables connected to the cards on the PCIe/XAUI riser being removed.**

   Label the cables to ensure proper connection later.

5. **Slide the server out of the rack.**

   See "Disconnect Power Cords From the Server" on page 62

6. **If you are servicing a PCIe/XAUI card, locate its position in the system.**

7. **Remove the PCI cross beam.**

   a. **Loosen the two captive Phillips screws on each end of the removable PCI cross beam.**

   b. **Slide the PCI cross beam back to remove it from the chassis.**

      Two mushroom standoffs secure the removable cross beam to the back of the system.

FIGURE: Removing the PCIe/XAUI Riser (Sun SPARC Enterprise T5120 Server)

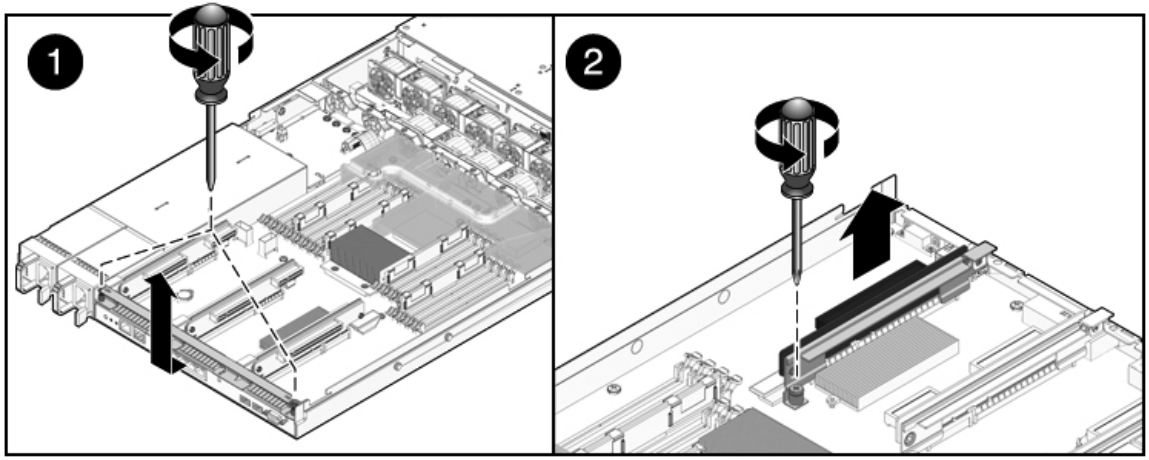
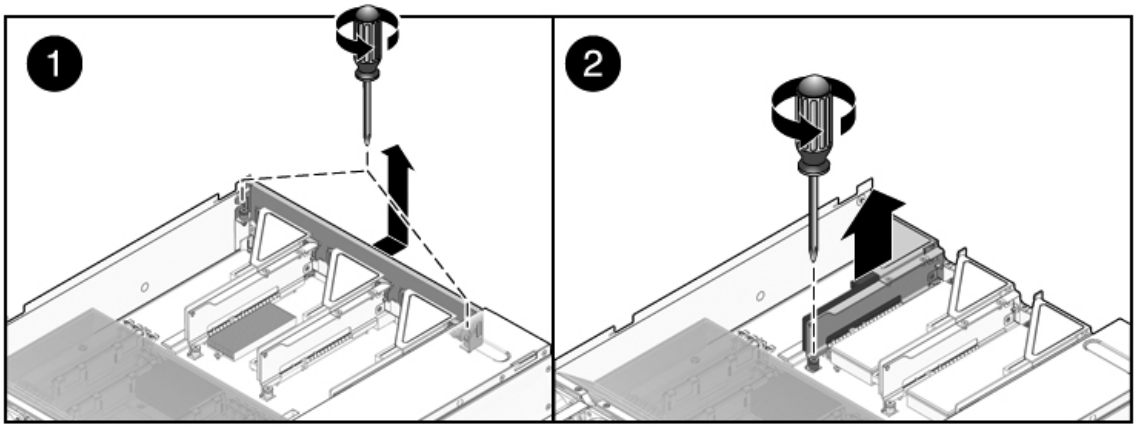


FIGURE: Removing the PCIe/XAUI Riser (Sun SPARC Enterprise T5220 Server)



8. **Loosen the captive screw securing the riser to the motherboard.**
9. **Lift the riser up to remove it from the system.**
   Remove the riser and any PCIe/XAUI cards attached to it as a unit.

Related Information

- "Install a PCIe/XAUI Riser" on page 104
- "Remove a PCIe or XAUI Card" on page 106
- "Install a PCIe or XAUI Card" on page 107

▼ Install a PCIe/XAUI Riser

1. **Lower the PCIe/XAUI riser and any cards attached to it into the system.**

Note – PCIe/XAUI and PCIe risers have keyed connectors to prevent incorrect installation on the motherboard.

---

2. **Ensure that the PCIe back panels are properly engaged with the corresponding slots in the motherboard tray/back panel connector assembly.**
3. **Tighten the captive screw to secure the riser to the motherboard.**

Note – Ensure that PCIe filler panels are installed in all empty PCIe/XAUI slots.

FIGURE: Installing the PCIe/XAUI Riser (Sun SPARC Enterprise T5120)

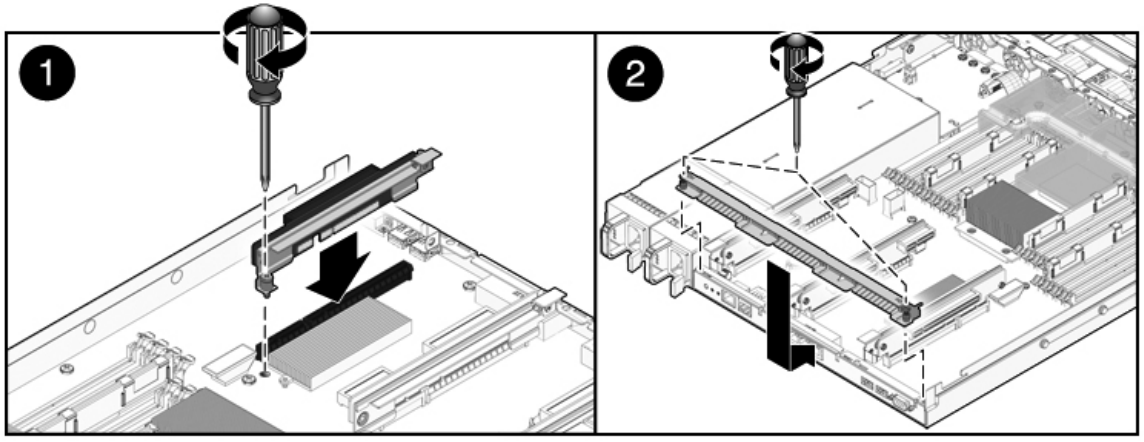
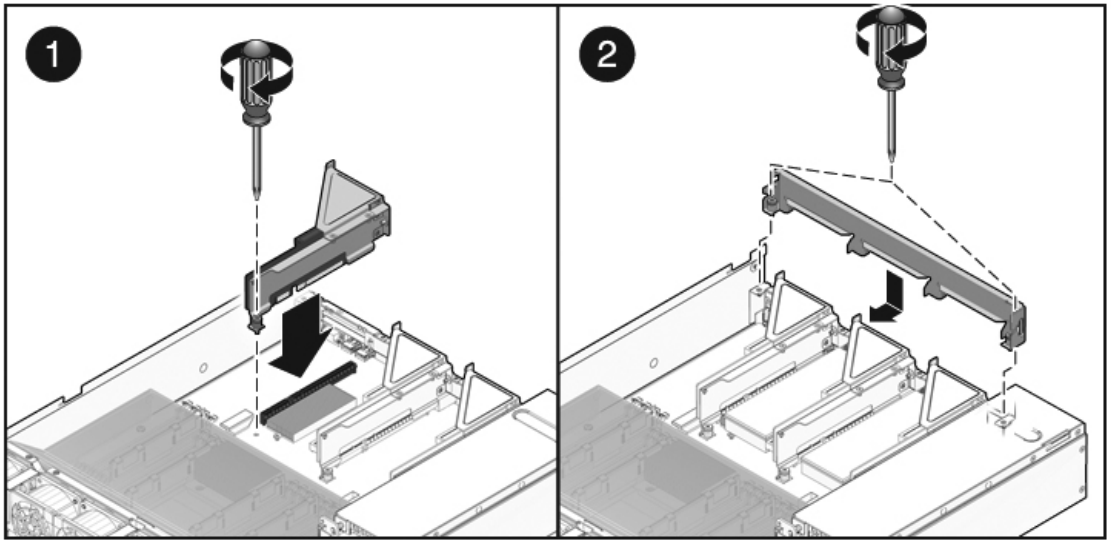


FIGURE: Installing the PCIe/XAUI Riser (Sun SPARC Enterprise T5220)



4. **Install the PCI cross beam.**

   Slide the cross beam forward over the PCIe/XAUI risers. Ensure that the cross beam is engaged with the standoffs on either side of the chassis rear panel PCI cross beam.

5. **Engage the two captive Phillips screws on both sides of the removable PCI cross beam and tighten the two screws to secure the removable PCI cross beam to the chassis.**

6. **Install the top cover.**

   See "Install the Top Cover" on page 175.

7. **Slide the server into the rack.**

   See "Return the Server to the Normal Rack Position" on page 177.

8. **Connect any data cables you removed to service the PCIe/XAUI cards.**

9. **Connect all power cables.**

   See "Connect Power Cords to the Server" on page 178.

Related Information

- "Remove a PCIe/XAUI Riser" on page 102
- "Remove a PCIe or XAUI Card" on page 106
- "Install a PCIe or XAUI Card" on page 107

▼ Remove a PCIe or XAUI Card

1. **Locate the PCIe/XAUI card that you want to remove. Note its corresponding riser board.**

   See "Rear Panel Components and Indicators on SPARC Enterprise T5120 Servers" on page 8 or "Rear Panel Components and Indicators on SPARC Enterprise T5220 Servers" on page 12.

2. **If necessary, note where the PCIe/XAUI cards are installed.**

3. **Unplug all data cables from the card.**

   Note the location of all cables for reinstallation later.

4. **Remove the riser board.**

   See "Remove a PCIe/XAUI Riser" on page 102

5. **Carefully remove the PCIe/XAUI card from the riser board connector.**

6. **Place the PCIe/XAUI card on an antistatic mat.**

7. **If you are not replacing the PCIe/XAUI card, install a PCIe/XAUI filler panel.**

   - Sun SPARC Enterprise T5120: PCIe filler panels are located in the removable PCI cross beam. Press the filler panel into the cross beam from the rear.

- Sun SPARC Enterprise T5220: PCIe filler panels are located on the riser board assembly. Press the filler panel into the riser board back panel from the rear.

Caution – To ensure proper system cooling and EMI shielding, you must use the appropriate PCIe filler panel for the server.

Related Information

- "Install a PCIe or XAUI Card" on page 107
- "Remove a PCIe/XAUI Riser" on page 102
- "Install a PCIe/XAUI Riser" on page 104

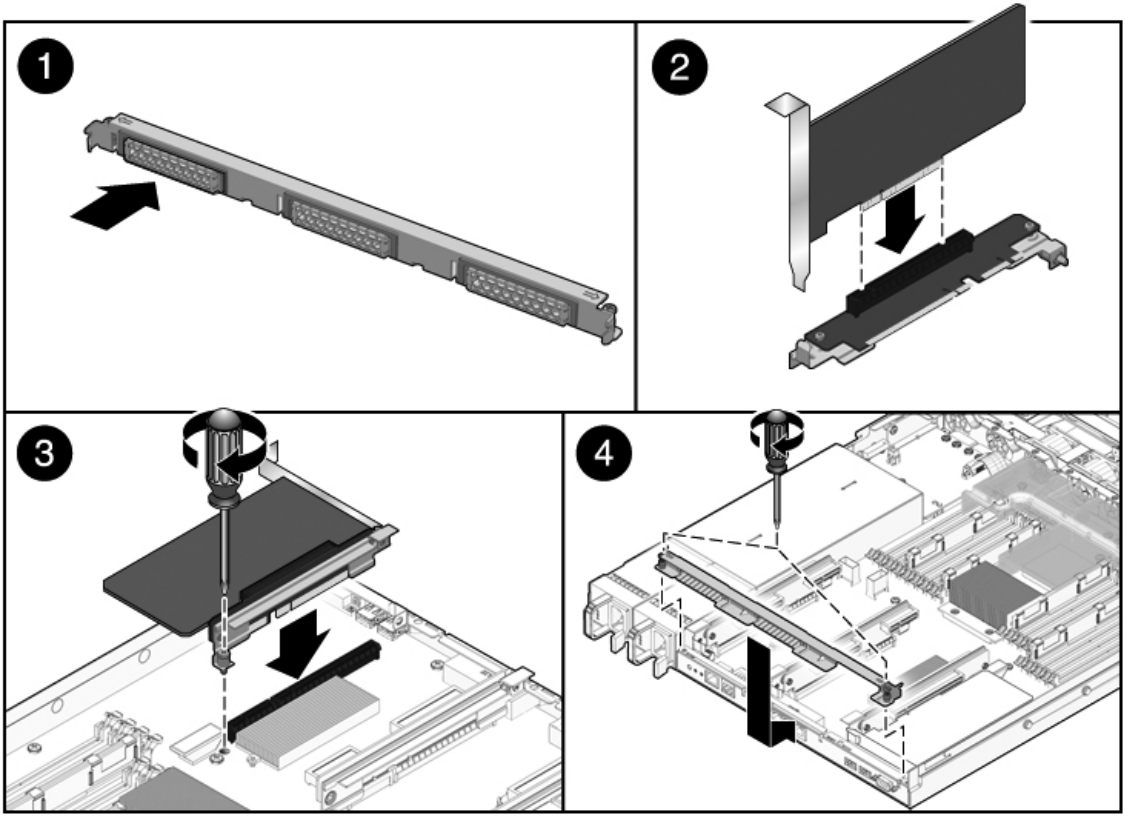
▼ Install a PCIe or XAUI Card

1. **Unpack the replacement PCIe or XAUI card and place it on an antistatic mat.**
2. **Locate the proper PCIe/XAUI slot for the card you are replacing.**
3. **If necessary, review the PCIe and XAUI card guidelines to plan your installation.**

   See "PCIe/XAUI Card Configuration Reference for Sun SPARC Enterprise T5120 Servers" on page 110 for additional information.
4. **Remove the PCIe/XAUI riser board.**

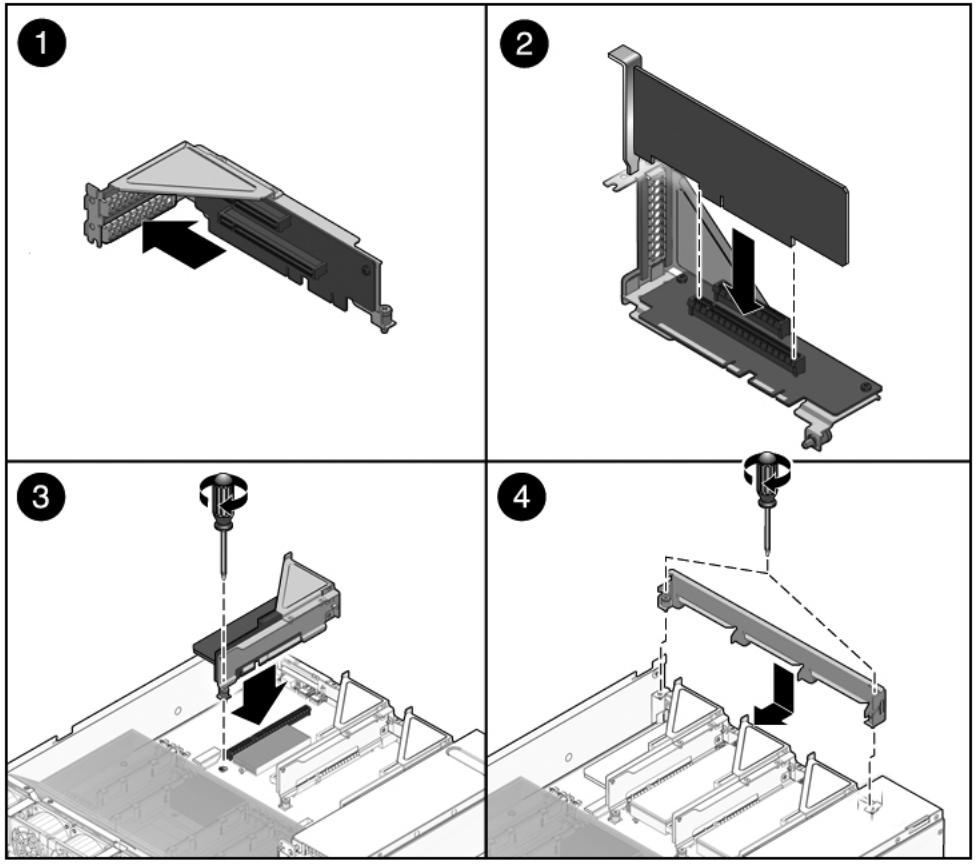
   See "Remove a PCIe/XAUI Riser" on page 102.
5. **Remove the PCI filler panel.**
   - **Sun SPARC Enterprise T5120 servers**: PCIe filler panels are located in the removable PCI cross beam. Press the filler panel in from the rear until it snaps into place, as shown in the following figure.

FIGURE: Installing a PCIe Card (Sun SPARC Enterprise T5120)



- **Sun SPARC Enterprise T5220 servers**: PCIe filler panels are located on the riser board assembly. Press the filler panel in from the rear until it snaps into place as shown in the following figure.

FIGURE: Installing a PCIe Card (Sun SPARC Enterprise T5220)



6. **Insert the PCIe/XAUI card into the correct slot on the riser board.**
7. **Replace the PCIe/XAUI riser.**
   See "Install a PCIe/XAUI Riser" on page 104.
8. **Install the top cover.**
   See "Install the Top Cover" on page 175.
9. **Slide the server into the rack.**
   See "Return the Server to the Normal Rack Position" on page 177.
10. **Connect any data cables required to the PCIe/XAUI card.**
    Route data cables through the cable management arm.

11. **Connect the power supplies.**

    See "Connect Power Cords to the Server" on page 178

Note – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

---

12. **Power on the server.**

    See "Power On the Server Using the `poweron` Command" on page 179 or "Power On the Server Using the Front Panel Power Button" on page 180.

Related Information

- "Remove a PCIe or XAUI Card" on page 106
- "Remove a PCIe/XAUI Riser" on page 102
- "Install a PCIe/XAUI Riser" on page 104

PCIe/XAUI Card Configuration Reference for Sun SPARC Enterprise T5120 Servers

The following table shows the physical PCIe/XAUI slot locations on the Sun SPARC Enterprise T5120 server, as viewed from the rear of the system.

TABLE: FB-DIMM Configuration Installation Map (Sun SPARC Enterprise T5220 Servers)

PCIe 0/XAUI 0	PCIe 1/XAUI 1	PCIe 2

Use the following table to plan your PCIe/XAUI card configuration on Sun SPARC Enterprise T5120 server.

TABLE: PCIe and XAUI Support (Sun SPARC Enterprise T5120 Servers)

Slot	PCIe Controller to Which the Slot is Connected	Supported Device Types	FRU Name
PCIe 0 or XAUI 0*	1	x8 PCIe operating at x4 XAUI expansion card	`/SYS/MB/RISER0/PCIE0` `/SYS/MB/RISER0/XAUI0`
PCIe 1 or XAUI 1†	1	x8 PCIe operating at x4 XAUI expansion card	`/SYS/MB/RISER1/PCIE1` `/SYS/MB/RISER1/XAUI1`
PCIe 2	0	x16 PCIe operating at x8	`/SYS/MB/RISER2/PCIE2`

* Slots 0 and 1 are shared PCIe/XAUI slots. You can only install one or the other type of card.

† Slots 0 and 1 are shared PCIe/XAUI slots. You can only install one or the other type of card.

PCIe and XAUI Card Reference for Sun SPARC Enterprise T5220 Servers

The following table shows the physical PCIe/XAUI slot locations on the Sun SPARC Enterprise T5220 server, as viewed from the rear of the system.

TABLE: FB-DIMM Configuration Installation Map (Sun SPARC Enterprise T5220 Servers)

PCIe 3	PCIe 4	PCIe 5
PCIe 0/XAUI 0	PCIe 1/XAUI 1	PCIe 2

Use the following table to plan your PCIe/XAUI card configuration on Sun SPARC Enterprise T5220 server.

TABLE: PCIe and XAUI Support (Sun SPARC Enterprise T5220 Servers)

Slot	PCIe Controller	Supported Device Types	FRU Name
PCIe 0 or XAUI 0*	1	x8 PCIe operating at x4 XAUI expansion card	/SYS/MB/RISER0/PCIE0 /SYS/MB/RISER0/XAUI0
PCIe 1 or XAUI 1†	1	x8 PCIe operating at x4 XAUI expansion card	/SYS/MB/RISER1/PCIE1 /SYS/MB/RISER1/XAUI1
PCIe 2	0	x16 PCIe operating at x8	/SYS/MB/RISER2/PCIE2
PCIe 3	1	x8 PCIe operating at x4	/SYS/MB/RISER0/PCIE3
PCIe 4	1	x8 PCIe operating at x4	/SYS/MB/RISER1/PCIE4
PCIe 5	1	x8 PCIe operating at x8	/SYS/MB/RISER2/PCIE5

* Slots 0 and 1 are shared PCIe/XAUI slots. You can only install one or the other type of card.

† Slots 0 and 1 are shared PCIe/XAUI slots. You can only install one or the other type of card.

Note – The lower numbered PCIe/XAUI slots (Slots 0 - 2) should be occupied first.

PCIe or XAUI names in ILOM messages are displayed with the full FRU name, such as `/SYS/MB/RISER0/PCIE0`.

Related Information

- “Remove a PCIe or XAUI Card” on page 106
- “Install a PCIe or XAUI Card” on page 107
- “Remove a PCIe/XAUI Riser” on page 102
- “Install a PCIe/XAUI Riser” on page 104

Servicing the Battery

These topics explain how to replace a faulty battery

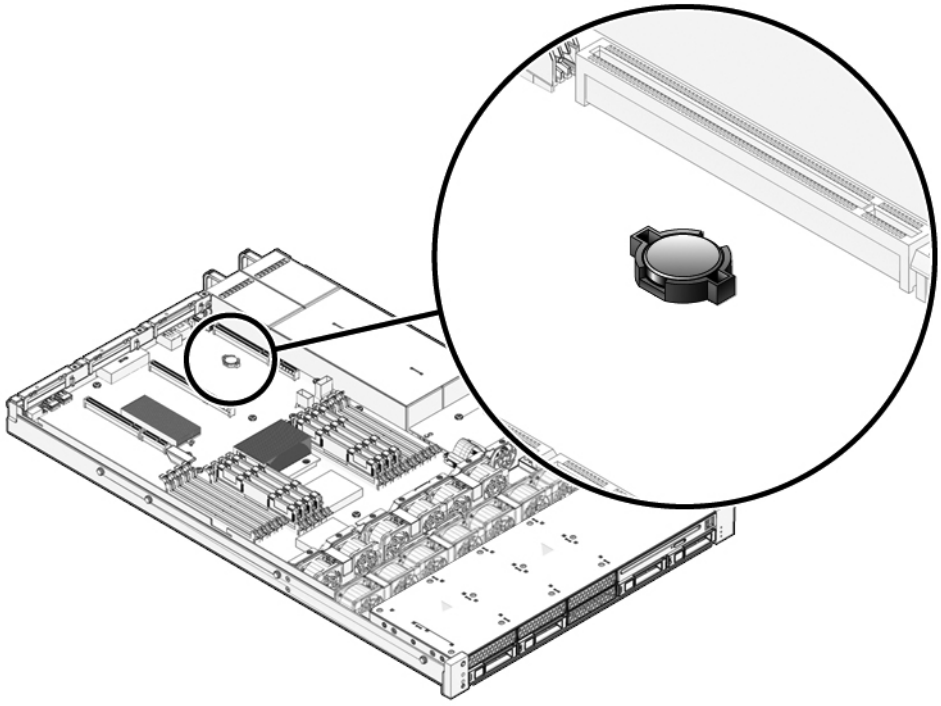
- “System Battery Overview” on page 112
- “Remove a Battery” on page 113
- “Install a Battery” on page 114

System Battery Overview

The battery maintains system time when the server is powered off and a time server is unavailable. If the server fails to maintain the proper time when it is powered off and not connected to a network, replace the battery.

The following figure shows the battery location on the Sun SPARC Enterprise T5120. The Sun SPARC Enterprise T5220 is in a similar location.

FIGURE: Battery Location (Sun SPARC Enterprise T5120 Server Shown)



Related Information

- "Remove a Battery" on page 113
- "Install a Battery" on page 114

▼ Remove a Battery

1. **Remove PCIe/XAUI riser 2.**

   See "Remove a PCIe/XAUI Riser" on page 102.

2. **Using a No. 1 flat-blade screwdriver, press the latch and remove the battery from the motherboard.**

Related Information

- "Install a Battery" on page 114

▼ Install a Battery

1. **Unpack the replacement battery.**
2. **Press the new battery into the battery holder on the motherboard.**

   Install with the positive side (+) facing upward, away from the motherboard.
3. **Install PCIe/XAUI riser 2.**

   See "Install a PCIe/XAUI Riser" on page 104.
4. **Use the ILOM `setdate` command to set the day and time.**

   See the *Sun Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun SPARC Enterprise T5120 and T5220 Servers*.
5. **After returning the server to operation, check and reset the Solaris OS date.**

Related Information

- "Remove a Battery" on page 113.

Servicing the SCC Module

These topics explain how to replace a faulty SCC module.

- "SCC Module Overview" on page 114
- "Remove a Faulty SCC Module" on page 115
- "Install a New SCC Module" on page 116

SCC Module Overview

The SCC module contains system host ID, MAC addresses and some ILOM configuration variables. You need to ensure that these values are available to the service processor once servicing of the SCC module is complete:

- **Replacing the motherboard** -- When replacing the motherboard, you will transfer the current SCC module from the faulty motherboard and to the new motherboard.

  See "Remove the Motherboard Assembly" on page 118 and "Install the Motherboard Assembly" on page 120 for additional information.

- **Replacing a faulty SCC module** -- When replacing a faulty SCC module, you must obtain the host ID, MAC addresses, and ILOM configuration settings stored in the SCC module you are replacing. This will enable you to configure them into new SCC module.

  See "Remove a Faulty SCC Module" on page 115 and "Install a New SCC Module" on page 116 for additional information.

Note – Some firmware variable settings are not stored in the SCC module. If you are replacing a motherboard, these settings will become the factory default settings.

Related Information

- "Remove a Faulty SCC Module" on page 115
- "Install a New SCC Module" on page 116

▼ Remove a Faulty SCC Module

Caution – This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause server components to fail.

---

1. **Use the `showsc` ALOM CMT compatibility command to display the ILOM configuration variable settings in the SCC module being replaced.**

   Record these values for use when you install the new SCC module.

2. **Power off the server.**

   See "Removing Power From the System" on page 60.

3. **Remove the server from the rack.**

   See "Remove the Server From the Rack" on page 64.

4. **Attach an antistatic wrist strap.**

5. **Remove the top cover.**

   See "Remove the Top Cover" on page 67.

6. **Remove the air duct.**

   See "Remove the Air Duct" on page 100.

7. **Remove PCIe/XAUI riser 2.**

   See "Remove a PCIe/XAUI Riser" on page 102.

Note – The server will not function correctly without the SCC module installed.

8. **Pull the SCC module straight up from its connector.**

Related Information

- "SCC Module Overview" on page 114
- "Install a New SCC Module" on page 116

▼ Install a New SCC Module

Caution – This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause server components to fail.

1. **Unpack the replacement SCC module and set it on an antistatic mat.**
2. **Align the SCC module with its connector on the motherboard.**

Note – The SCC module and its connector are keyed.

3. **Press the SCC module down until it seats.**
4. **Install PCIe/XAUI riser 2.**

   See "Install a PCIe/XAUI Riser" on page 104.
5. **Install the top cover.**

   See "Install the Top Cover" on page 175.
6. **Slide the server into the rack.**

   See "Reinstall the Server in the Rack" on page 176.
7. **Connect the power supplies.**

   See "Connect Power Cords to the Server" on page 178.

Note – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

8. **Power on the server.**

   See "Power On the Server Using the `poweron` Command" on page 179 or "Power On the Server Using the Front Panel Power Button" on page 180.

9. **If the previous SCC module had modified ILOM configuration variables and you recorded them, configure the new SCC module with those values.**

Related Information

- "SCC Module Overview" on page 114
- "Remove a Faulty SCC Module" on page 115
- "Servicing the Motherboard Assembly" on page 117

Servicing the Motherboard Assembly

These topics explain how to remove and install the motherboard assembly.

- "Motherboard Servicing Overview" on page 117
- "Remove the Motherboard Assembly" on page 118
- "Install the Motherboard Assembly" on page 120

Motherboard Servicing Overview

The motherboard assembly must be removed in order to access the following components:

- Power distribution board
- Power supply backplane (Sun SPARC Enterprise T5220 server)
- Paddle card

Note – This procedure requires removing the server from the rack.

Caution – The server is heavy. Two people are required to remove it from the rack.

The SCC module contains system host ID and MAC addresses. If you replace the motherboard, transfer the SCC module from the old motherboard to the new motherboard. This action will retain the server's original host ID and MAC address.

Note – The firmware configuration variable settings are not stored in the SCC module. If you replace the motherboard, these settings will become the factory default settings. If possible, keep a record of any firmware variables that have been changed from the factory default values so you can configure the new motherboard with those settings.

Related Information

- "Remove the Motherboard Assembly" on page 118
- "Install the Motherboard Assembly" on page 120

▼ Remove the Motherboard Assembly

Caution – This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause server components to fail.

1. **Run the ALOM CMT `showrc` command and make a note of any SP variables that have been modified from the factory default.**
2. **Stop Solaris OS to get the OpenBoot PROM prompt.**
3. **Run the `printenv` command to make a note of any OpenBoot PROM variables that have been modified**
4. **Power off the server.**

   See "Removing Power From the System" on page 60.
5. **Remove the server from the rack.**

   See "Remove the Server From the Rack" on page 64.
6. **Attach an antistatic wrist strap.**
7. **Remove the top cover.**

   See "Remove the Top Cover" on page 67.
8. **Remove the air duct.**

   See "Remove the Air Duct" on page 100.
9. **Remove all PCIe/XAUI riser assemblies.**

   See "Remove a PCIe/XAUI Riser" on page 102.

Note – Make note of the location of expansion cards in PCIe/XAUI risers 0 and 1.

10. **Disconnect the motherboard-to-power distribution board ribbon cable.**
11. **Disconnect the hard drive data cables:**
    a. **Press the latching mechanism on the connector to release the cable plug.**

       If you have difficulty releasing the cable plug, first push the plug slightly into the connector, then press the latching mechanism.

    b. **Keeping the latching mechanism pressed, pull the plug from the connector on the hard drive backplane.**

Caution – The hard drive data cables are delicate. Ensure they are safely out of the way when servicing the motherboard.

12. **If you are replacing the motherboard, remove the following components:**
    - All FB-DIMMs. Note memory configuration so that you can install the FB-DIMMs in the replacement motherboard.
    - SCC Module.
13. **Using a No. 2 Phillips screwdriver, remove the four screws that secure the motherboard assembly to the bus bar.**

Caution – Use care when removing the bus bar screws to avoid touching a heat sink, which can be dangerously hot.

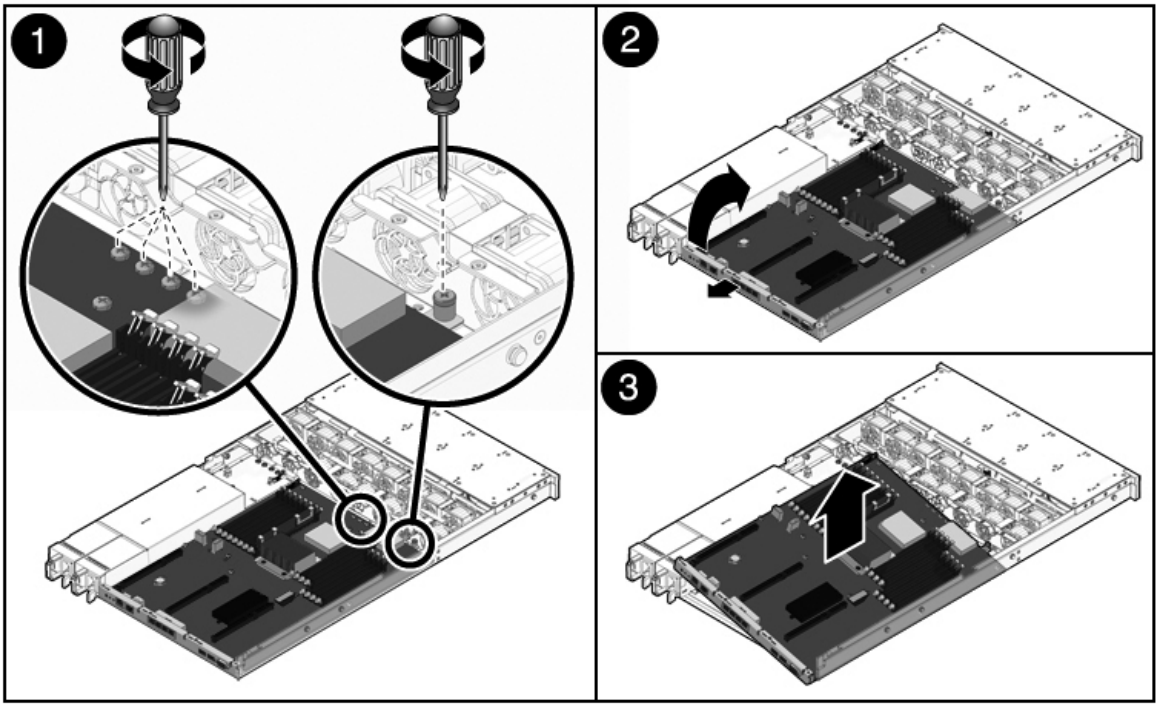
Note – Set the four screws aside. You must use these screws to attach the motherboard to the bus bar during installation.

14. **Loosen the captive screw securing the motherboard to the chassis.**

    The captive screw is green, and is located to the left of the bus bar screws.
15. **Using the green handle, slide the motherboard toward the back of the system and lift it out of the chassis.**

Caution – Some components on the motherboard might be hot. Use caution when handling the motherboard, especially near the CMP heat sinks.

FIGURE: Removing the Motherboard Assembly (Sun SPARC Enterprise T5120 Server Shown)



16. **Place the motherboard assembly on an antistatic mat.**

Related Information

- "Install the Motherboard Assembly" on page 120

▼ Install the Motherboard Assembly

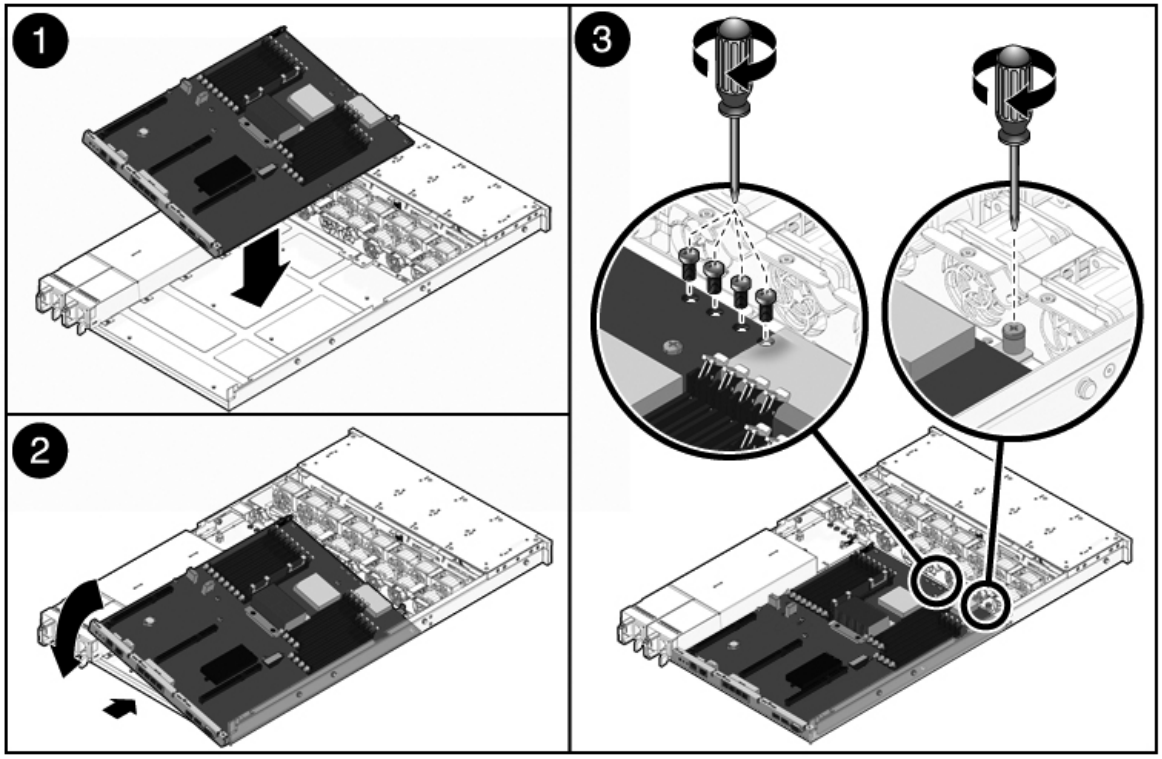
Caution – This procedure requires that you handle components that are sensitive to static discharge. Static discharges can cause the components to fail.

1. **Tilt the motherboard assembly to position it into the chassis.**

   When you install the motherboard, ensure that you position the board as far forward in the chassis as possible.

2. **Position the motherboard so that its screw holes align with the chassis standoffs.**

FIGURE: Installing the Motherboard Assembly (Sun SPARC Enterprise T5120 Server)



3. **Using the green handle and the back edge of the motherboard tray, push down firmly and equally while sliding the motherboard to the front of the chassis.**

Tip – After installing the motherboard into the chassis, ensure that the motherboard is correctly seated by gently lifting up on the handles. If the board moves upward, then it is not correctly seated. Ensure that the motherboard tray sits flush with the chassis floor. Also, check for binds and ensure that the bus bar screw holes are correctly aligned with the bus bar at the front of the motherboard.

---

4. **Tighten the captive screw that secures the motherboard to the front of its tray in the chassis.**

5. **Install the four No. 2 Phillips screws that secure the motherboard to the bus bar.**

Note – When you reinstall the motherboard, you must use the correct screws to attach the motherboard to the bus bar.

---

6. **If you are installing a new motherboard, install the following components:**

   a. **All FB-DIMMs removed from the previous motherboard. Ensure that the FB-DIMM modules are installed in the same memory configuration as they were in before.**

      See "FB-DIMM Configuration Guidelines" on page 95.

   b. **SCC module. See** "SCC Module Overview" on page 114**.**

7. **Connect the hard drive data cables. For cable routing instructions, see whichever of the following topics apply:**

   - "Internal Cables for Onboard SAS Controller Cards in SPARC Enterprise T5120 Servers" on page 188
   - "Internal Cables for Onboard SAS Controller Cards in Sun SPARC Enterprise T5220 Servers" on page 202

8. **Install the air duct.**

   See "Install the Air Duct" on page 101..

9. **Reinstall the motherboard-to-power distribution board ribbon cable.**

10. **Reinstall the PCIe and XUAI risers.**

    See "Install a PCIe/XAUI Riser" on page 104.

11. **Install the top cover.**

    See "Install the Top Cover" on page 175.

12. **Install the server into the rack.**

    See "Reinstall the Server in the Rack" on page 176.

13. **Attach the power cables.**

    See "Connect Power Cords to the Server" on page 178.

14. **Power on the server.**

    See "Power On the Server Using the `poweron` Command" on page 179 or "Power On the Server Using the Front Panel Power Button" on page 180.

Related Information

- "Remove the Motherboard Assembly" on page 118

Servicing Fan Modules

These topics explain how to service faulty fan modules.

- "Fan Module Overview" on page 123
- "Remove a Fan Module" on page 125
- "Install a Fan Module" on page 127

Related Information

- "Preparing to Service the System" on page 57

Fan Module Overview

The fan modules are mounted across the width of the chassis between the hard drive cage and the CPU modules. They are accessed by lifting the top cover door.

The minimum number of fan modules installed in the server is different for the two server models:

- Sun SPARC Enterprise T5120 Servers contain at least four fan modules.
- Sun SPARC Enterprise T5220 Servers contain at least three fan modules.

Each fan module contains two fans mounted in an integrated, hot-swappable CRU. If a fan module fails, replace it as soon as possible to maintain server availability.

Caution – Hazardous moving parts. Unless the power to the server is completely shut down, the only service permitted in the fan compartment is the replacement of the fan modules by trained personnel.

Fan Module Configurations for Sun SPARC Enterprise T5120 Servers (4- and 8-Disk Capable)

The following table shows the FRU device names for the fan modules in the four hard drive capable Sun SPARC Enterprise T5120 server.

TABLE: Fan Module Locations and FRU Names for Sun SPARC Enterprise T5120 Servers With a 4-Drive Capable Backplane

/SYS/FANBD1/FM0	/SYS/FANBD1/FM1	/SYS/FANBD1/FM2	(Empty)
(Empty)	/SYS/FANBD0/FM1	(Empty)	(Empty)
Front of System			

The following table shows the FRU device names for the fan modules in the eight hard drive capable Sun SPARC Enterprise T5120 server.

TABLE: Fan Module Locations and FRU Names for Sun SPARC Enterprise T5120 Servers With an 8-Drive Capable Backplane

/SYS/FANBD1/FM0	/SYS/FANBD1/FM1	/SYS/FANBD1/FM2	(Empty)
/SYS/FANBD0/FM0	/SYS/FANBD0/FM1	/SYS/FANBD0/FM2	/SYS/FANBD0/FM3
Front of System			

Fan Module Configurations for Sun SPARC Enterprise T5220 Servers (8- and 16-Disk Capable)

The following table shows the FRU device names for the fan modules in the eight and sixteen hard drive capable Sun SPARC Enterprise T5220 server.

TABLE: Fan Module Locations and FRU Names for Sun SPARC Enterprise T5220 Servers With an 8- or 16-Drive Capable Backplane

(Empty)	(Empty)	(Empty)
/SYS/FANBD0/FM0	/SYS/FANBD0/FM1	/SYS/FANBD0/FM2
Front of System		

Fan Module Status LEDs

Each fan module contains a pair of LEDs, which are visible when you open the fan compartment access door. The following table describes the status LEDs located on the fan modules.

TABLE: Fan Module Status LEDs

LED		Color	Notes
Power OK		Green	This LED is lit when the system is powered on and the fan module is functioning correctly.
Service Required		Amber	This LED is lit when the fan module is faulty. In addition, the system Fan Fault LED is lit.

The front and rear panel Service Required LEDs are also lit if the system detects a fan module fault.

If the fan fault causes an over temperature condition to occur, the system Overtemp LED will turn on and an error message will be logged as well as displayed on the system console.

Related Information

- "Front Panel Controls and Indicators on SPARC Enterprise T5120 Servers" on page 5
- "Rear Panel Components and Indicators on SPARC Enterprise T5120 Servers" on page 8
- "Front Panel Controls and Indicators on SPARC Enterprise T5220 Servers" on page 9
- "Rear Panel Components and Indicators on SPARC Enterprise T5120 Servers" on page 8

▼ Remove a Fan Module

Caution – When changing the fan modules, remove only the fan modules. Do not service any other components in the fan compartment unless all power is removed from the system, including removing the power cords.

1. **Extend the server to the maintenance position.**

   See "Extend the Server to the Maintenance Position" on page 63.

2. **Lift the latch and open the top cover door.**

Caution – The system might start to overheat if the top cover door is left open for more than 60 seconds.

3. **The faulty fan module is identified with a corresponding fault LED.**

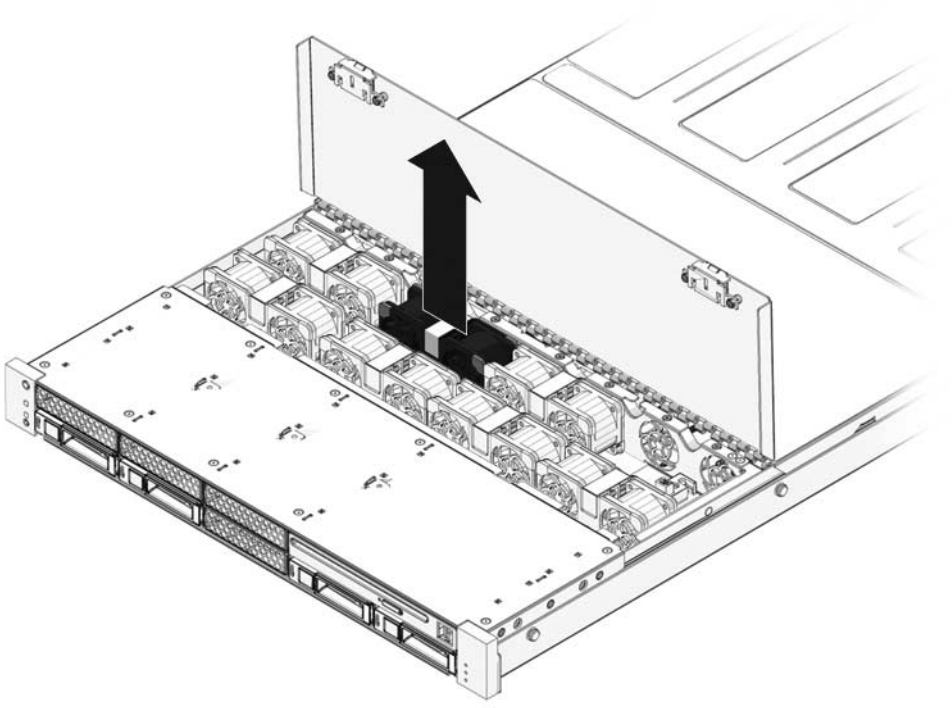
   On Sun SPARC Enterprise T5120 servers, the Fan Fault LEDs are located on the fan board.

   On Sun SPARC Enterprise T5220 servers, the Fan Fault LEDs are located on the fan modules.

4. **Grasp the fan module by green fan module label and lift the module up out of the chassis.**

Caution – To avoid damaging the fan module connector, lift the fan module straight up. Do not rock it from side to side.

FIGURE: Removing a Fan Module



Related Information

- "Extend the Server to the Maintenance Position" on page 63

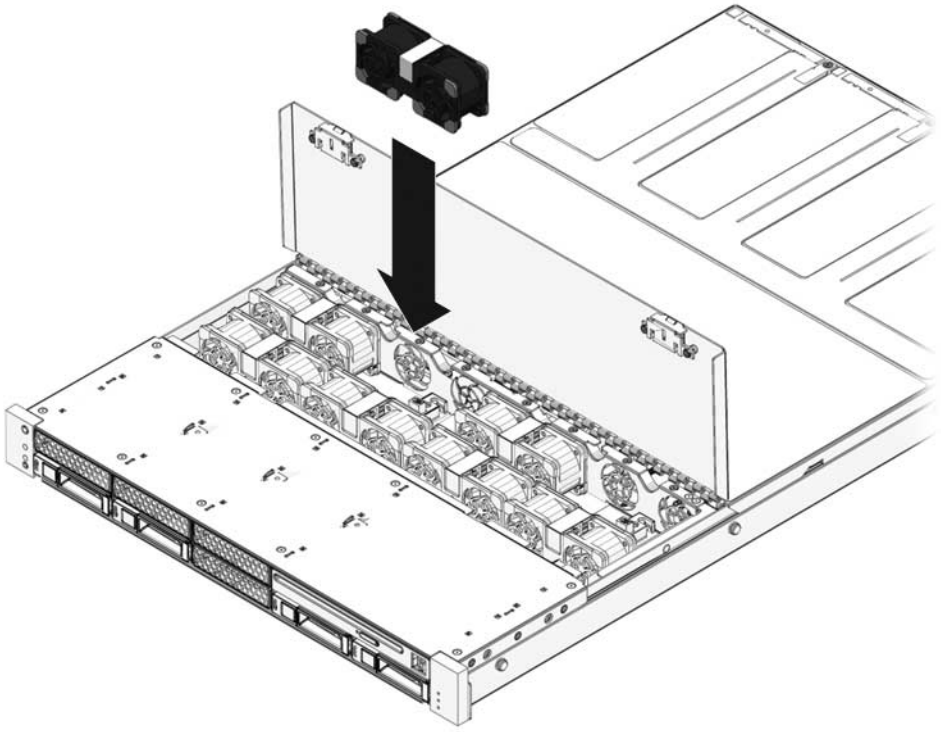
▼ Install a Fan Module

Caution – To ensure proper system cooling, be certain to install the replacement fan module in the same slot from which the faulty fan was removed.

1. **With the top cover door open, install the replacement fan module into the server.**

   The fan modules are keyed to ensure that they are installed facing in the correct direction.

FIGURE: Installing a Fan Module



2. **Apply firm pressure to fully seat the fan module.**
3. **Verify that the Fan Fault LED on the replaced fan module is off.**
4. **Close the top cover door.**
5. **Verify that the system Fan Fault LED, Service Required LEDs, and the individual fan module Fault LED are off.**
6. **Run the ILOM `show faulty` command to verify that the fan fault has been cleared.**

   See "Detecting Faults With ILOM" on page 22 for more information on using the `show faulty` command.

Related Information

- "Extend the Server to the Maintenance Position" on page 63
- "Faults Displayed by `show faulty`" on page 29

Servicing Power Supplies

The topics explain how to remove and replace power supply modules.

- "Power Supplies Overview" on page 129
- "Remove a Power Supply" on page 131
- "Install a Power Supply" on page 134
- "Power Supply Configuration Reference" on page 136

Power Supplies Overview

These servers are equipped with redundant hot-swappable power supplies. With redundant power supplies, you can remove and replace a power supply without shutting the server down.

Some models of the server use AC input power and other models use DC input power. For input power specifications for both AC and DC models, refer to the *Sun SPARC Enterprise T5120 and T5220 Server Site Planning Guide*.

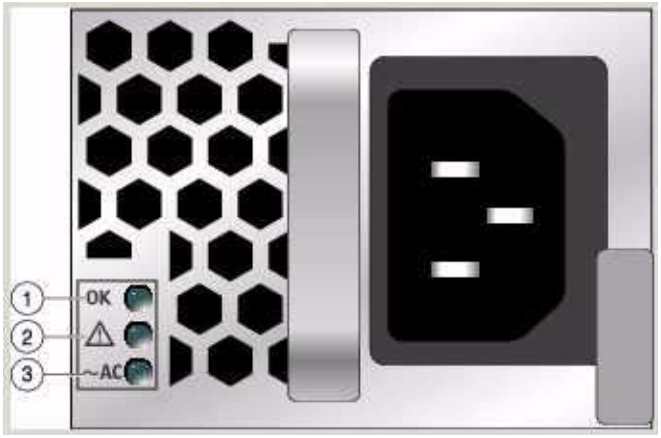
The server models that run on DC input power require you to build the input power cable to specific safety guidelines. For instructions on building the DC power cables and the safety guidelines, refer to the *Sun SPARC Enterprise T5120 and T5220 Server Installation Guide*.

Note – The instructions in this manual use the AC server models as examples. However, unless noted otherwise, the instructions also apply to the DC server models.

Power Supply Status LEDs

Each power supply is provided with a set of three LEDs, which can be viewed on the back panel of the system.

FIGURE: Power Supply LEDs (Sun SPARC Enterprise T5120 Server Shown)



The following table describes the three power supply LEDs

TABLE: Power Supply Status LEDs

Legend	LED	Icon	Color	
1	OK	OK	Green	This LED lights when the power supply DC voltage from the PSU to the server is within tolerance.
2	Fault	⚠	Amber	This LED is lit when the power supply is faulty. **Note -** The front and rear panel Service Required LEDs are also lit if the system detects a power supply fault.
3	AC Present	~AC*	Green	This LED turns on when AC voltage is applied to the power supply. Note - For DC models, this is the DC input OK LED. It turns on when the input DC power is present.

* For DC PSUs, this symbol is either DC or a power connector.

Note – If a power supply fails and you do not have a replacement available, leave the failed power supply installed to ensure proper airflow in the server.

Related Information

- "Servicing Power Distribution Boards" on page 160

- "Servicing Power Supply Backplanes (Sun SPARC Enterprise T5220 Servers)" on page 167
- "Remove a Power Supply" on page 131
- "Install a Power Supply" on page 134

▼ Remove a Power Supply

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

1. **Move to the rear of the server chassis so you can view the power supply status LEDs.**

   The amber Fault LED on the failed power supply will be on. For verification, you can run the ILOM `show faulty` command to see if either power supply reports a fault condition.

2. **(Optional) You can verify the status indicated by the Fault LED by running the ILOM `show faulty` command.**

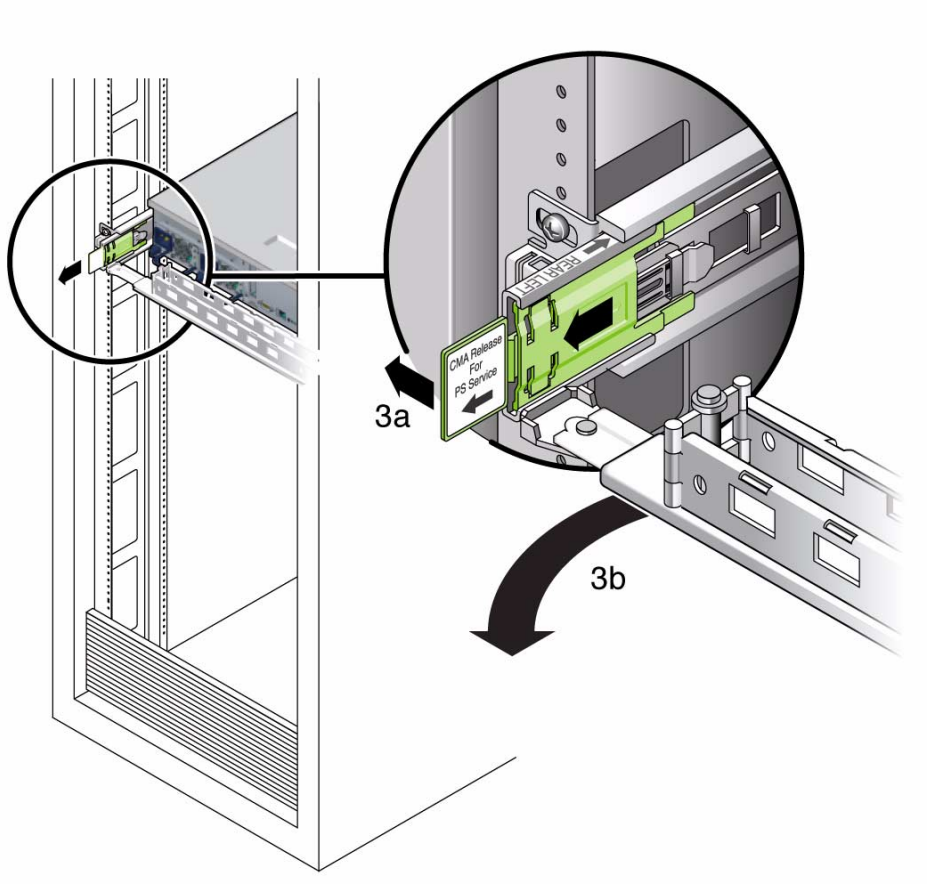
   The Fault LED indication is verified if the `show faulty` command lists that power supply as faulty.

3. **Locate and release the cable management arm (CMA).**

   a. **Press and hold the tab as show in the following figure.**

   b. **Rotate the cable management arm out of the way so that you can access the power supply.**

FIGURE: Cable management Arm Release Mechanism



4. **Based on the model of your server (AC or DC), remove power from the server in one of the following ways:**
   - AC server models – Disconnect the power cord from the faulty power supply.
   - DC server models – Turn off the power using the circuit breaker on the power source.

Caution – For server models with DC input power, do not disconnect the power cable at the Wago connector on the server DC power supply unit. Instead, turn off the power at the circuit breaker on the power source.

5. **Grasp the power supply handle and press the release latch.**

FIGURE: Power Supply Release Handle (Sun SPARC Enterprise T5120 Servers)

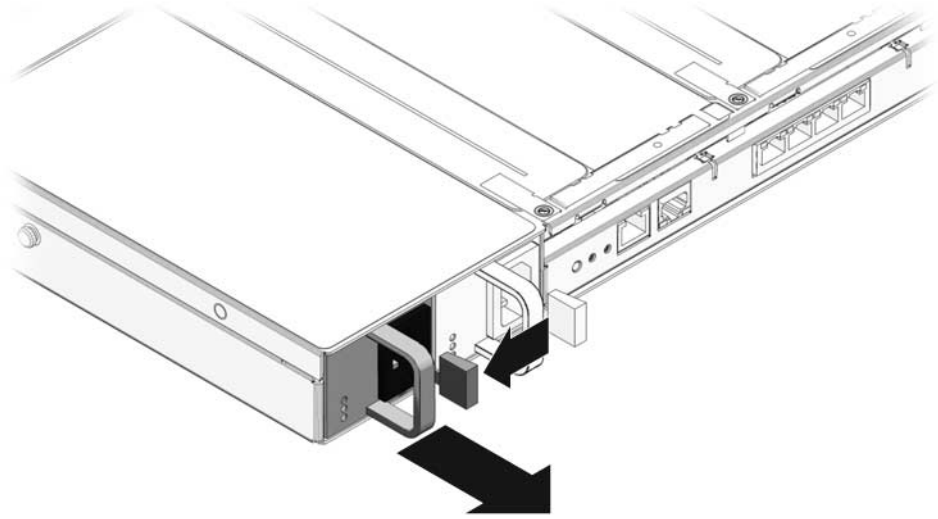
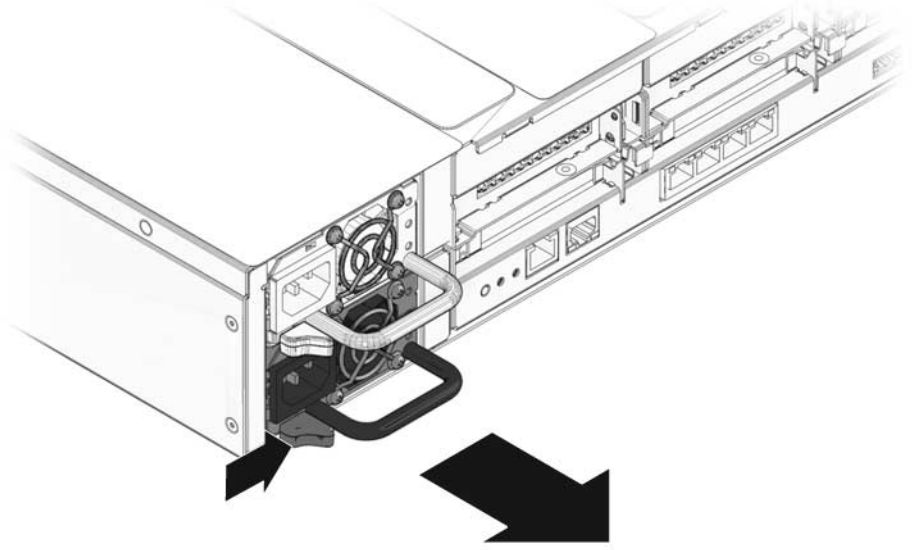


FIGURE: Power Supply Release Handle (Sun SPARC Enterprise T5220 Servers)



6. Pull the power supply out of the chassis.

▼ Install a Power Supply

1. **Align the replacement power supply with the empty power supply chassis bay.**
2. **Slide the power supply into the bay until it is fully seated.**

FIGURE: Installing a Power Supply (Sun SPARC Enterprise T5120 Server)

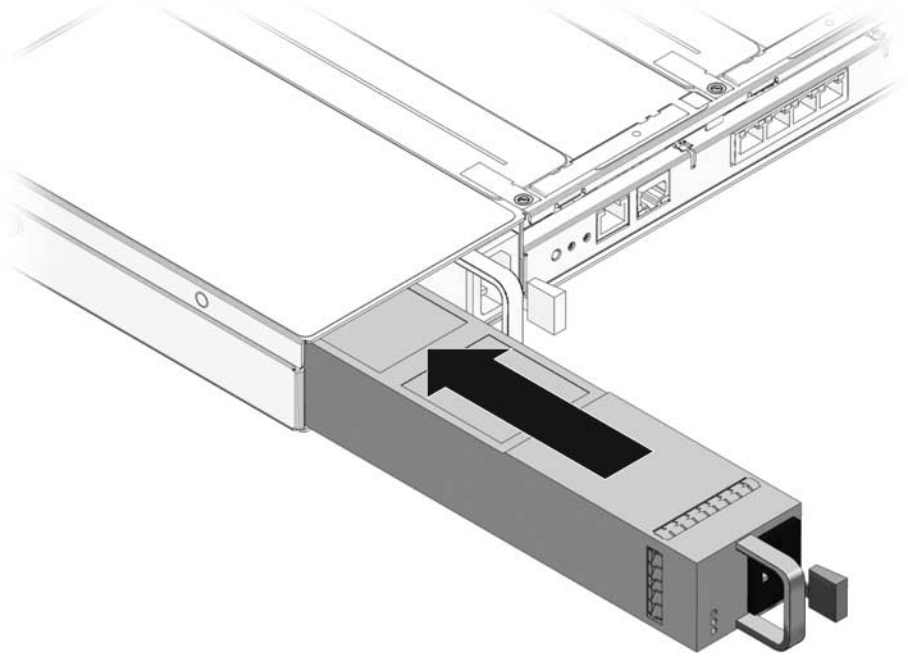
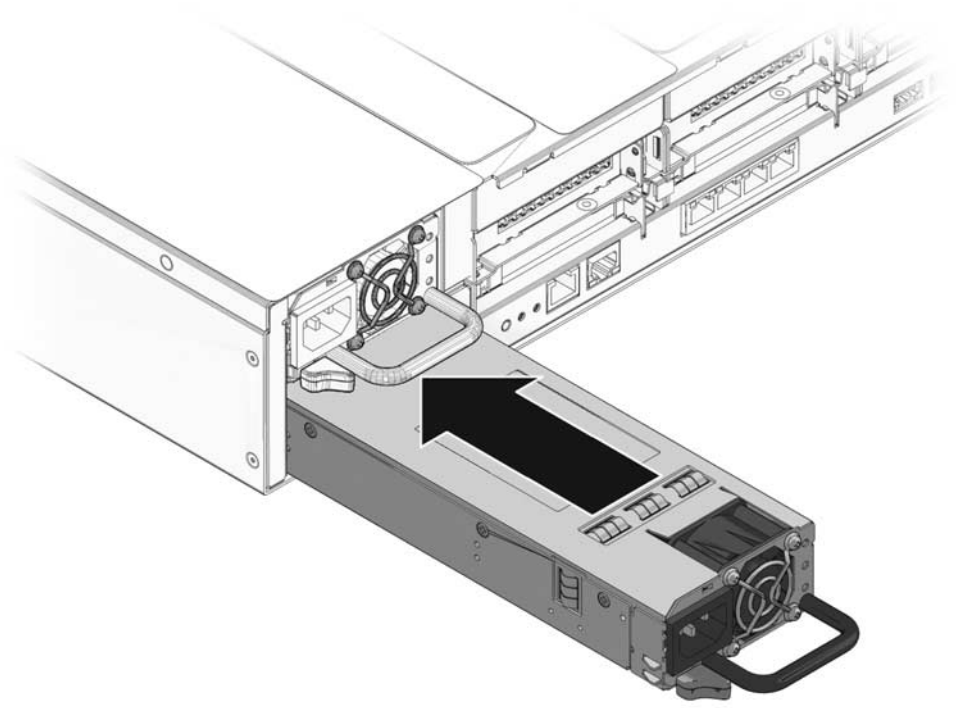


FIGURE: Installing a Power Supply (Sun SPARC Enterprise T5220 Server)



3. **Based on the model of your server (AC or DC), apply power to the power supply in one of the following ways:**
   - AC server models – Connect the power cord to the power supply.
   - DC server models – Turn on the power using the circuit breaker at the power source.

Caution – For server models with DC input power, always remove power by turning off the power at the power source circuit breaker. The Wago connector is not a service disconnect, and should only be disconnected after the power source circuit breaker is turned off.

4. **Verify that the PSU OK LED is lighted.**
5. **Close the CMA, inserting the end of the CMA into the rear left rail bracket.**
6. **Verify that the Fault LED on the replaced power supply, the system Power Supply Fault LED, and the front and rear Service Required LEDs are off.**

See "Power Supplies Overview" on page 129.

7. **At the ALOM CMT** `sc>` **prompt, type the** `showenvironment` **command to verify the status of the power supplies.**

Power Supply Configuration Reference

The following table shows the positions of the power supplies in a Sun SPARC Enterprise T5120 server as viewed from the server rear panel.

TABLE: Power Supply Locations and FRU Names for Sun SPARC Enterprise T5120 Servers

FRU Names	
/SYS/PS0 /SYS/PS1	

The following table shows the positions of the power supplies in a Sun SPARC Enterprise T5220 server as viewed from the server rear panel.

TABLE: Power Supply Locations and FRU Names for Sun SPARC Enterprise T5220 Servers

FRU Names	
/SYS/PS1	
/SYS/PS0	

Note – Both tables represent the power supplies with the FRU names displayed by the ILOM `show` command.

Servicing Boards and Components

These topics explain how to service field-replaceable units (FRUs) in Sun SPARC Enterprise T5120 and T5220 servers.

- "Important Safety Instructions" on page 137
- "Servicing DVD/USB Modules" on page 138
- "Servicing Fan Power Boards" on page 143
- "Servicing the Hard Drive Cage" on page 146
- "Servicing the Hard Drive Backplane" on page 152
- "Servicing Front Control Panel Light Pipe Assemblies" on page 156
- "Servicing Power Distribution Boards" on page 160
- "Servicing Power Supply Backplanes (Sun SPARC Enterprise T5220 Servers)" on page 167
- "Servicing Paddle Cards" on page 171

Important Safety Instructions

This topic provides a summary of the safety precautions you need to follow when servicing circuit boards and other components contained the server chassis.

Most components housed within the chassis must *never* be serviced while power is present in the chassis. The following table identifies those components.

TABLE: Components That Require Removal of System Power Before Servicing is Performed

Component	Servicing procedures
DVD/USB module	"Servicing DVD/USB Modules" on page 138
Fan power boards	"Servicing Fan Power Boards" on page 143
Hard drive cage	"Servicing the Hard Drive Cage" on page 146

TABLE: Components That Require Removal of System Power Before Servicing is Performed

Component	Servicing procedures
Hard drive backplane	"Servicing the Hard Drive Backplane" on page 152
Front control panel light pipe	"Servicing Front Control Panel Light Pipe Assemblies" on page 156
Power distribution board	"Servicing Power Distribution Boards" on page 160
Power supply backplane (SPARC Enterprise T5220 server)	"Servicing Power Supply Backplanes (Sun SPARC Enterprise T5220 Servers)" on page 167
Paddle card	"Servicing Paddle Cards" on page 171

Note – Fan modules are the only chassis components that may be removed or installed with power present.

Caution – Never run the server with the covers removed. Hazardous voltage is present.

Caution – Chassis covers must be in place while the server is running to ensure proper air flow within the chassis. Running the server with the covers removed may result in damage to the equipment.

Related Information

- "General Safety Information" on page 57

Servicing DVD/USB Modules

These topics explain how to remove and install DVD/USB modules.

- "DVD/USB Module Overview" on page 139
- "Remove the DVD/USB Module" on page 139
- "Install the DVD/USB Module" on page 141

Related Information

- “Remove the Hard Drive Backplane” on page 152

DVD/USB Module Overview

The DVD ROM drive and front USB board are mounted in a removable module that is accessed from the system’s front panel. The DVD/USB module must be removed from the hard drive cage in order to service the hard drive backplane.

FIGURE: DVD/USB Module in a Sun SPARC Enterprise T5120 Server

The Hard Drive backplane supports either a SATA DVD or a PATA DVD, depending on when it was manufactured. Servers that contain a SATA-compatible backplane have a "SATA" label on the front bezel. Servers with the older PATA-compatible backplanes do not have any DVD label on the bezel.

Note – SATA-compatible backplanes have special keying that prevents full insertion of a PATA DVD. When installing a PATA-type DVD, do not force the module if it resists full insertion. It may be that the backplane is not PATA-compatible.

Related Information

- “Remove the DVD/USB Module” on page 139
- “Install the DVD/USB Module” on page 141
- “Remove the Hard Drive Backplane” on page 152

▼ Remove the DVD/USB Module

1. **Power off the server.**

   See “Removing Power From the System” on page 60.

2. **Unplug the power cords.**

   See "Disconnect Power Cords From the Server" on page 62.

3. **Attach an antistatic wrist strap.**

4. **Remove the hard drive that is adjacent to the DVD/USB module.**

   The number of this HDD will vary, depending on the backplane type:

   - 4-disk capable backplane: remove HDD3

     See "Four-Drive Capable Backplane Configuration Reference" on page 77.

   - 8-disk capable backplane: remove HDD7

     See "Eight-Drive Capable Backplane Configuration Reference" on page 78.

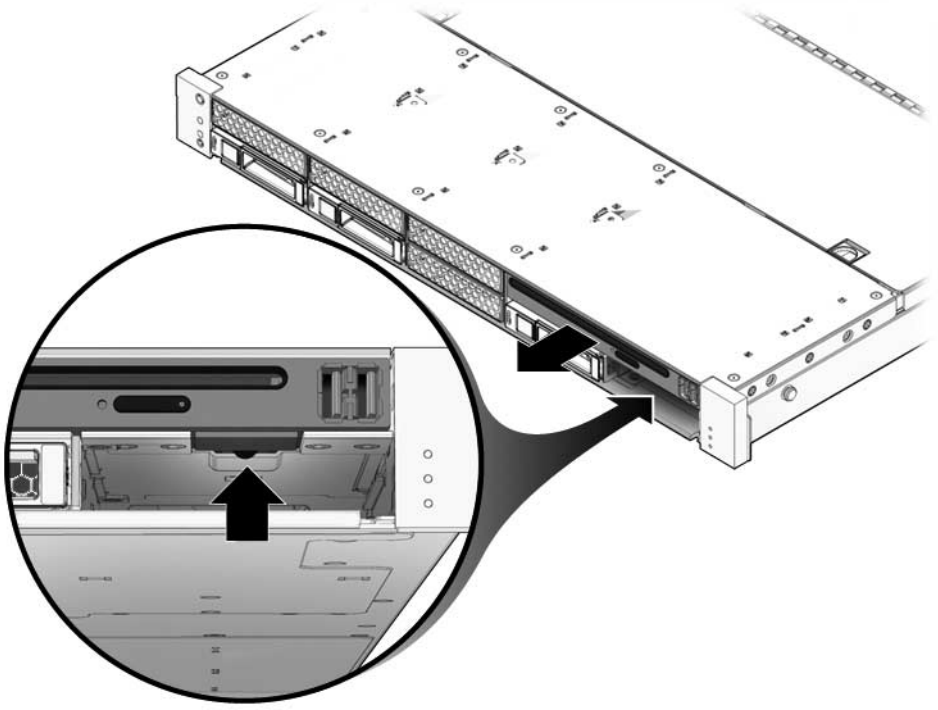
   - 16-disk capable backplane: remove HDD13

     See "Sixteen-Drive Capable Backplane Configuration Reference" on page 79.

5. **Release the DVD/USB module from the hard drive backplane.**

   Use the finger indentation in the hard drive bay below the DVD/USB module to extend the release tab.

FIGURE: Removing the DVD/USB Module (illustrates removal from a SPARC Enterprise T5120 server)



6. **Slide the DVD/USB module out of the hard drive cage.**
7. **Place the module on an antistatic mat.**

Related Information

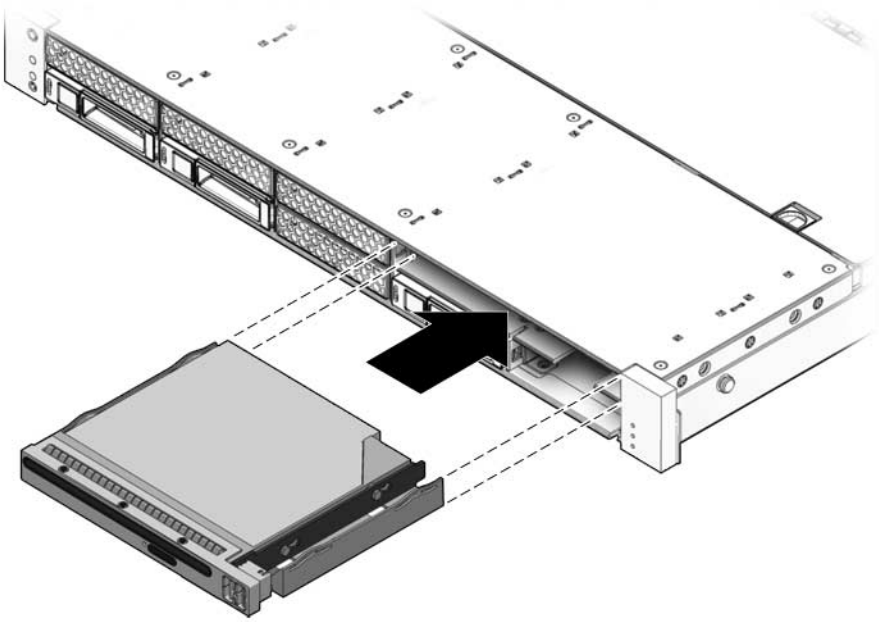
- "Install the DVD/USB Module" on page 141
- "Servicing the Hard Drive Backplane" on page 152

▼ Install the DVD/USB Module

Caution – Be certain the DVD type and Hard Drive backplane are compatible: both are SATA or both are PATA types. Special keying will resist installation of a PATA DVD into a SATA-type DVD bay. Do not force the module if you meet resistance or you may damage the backplane, DVD/USB Module, or both.

1. **Slide the DVD/USB module into the front of the chassis until it seats.**

FIGURE: Installing the DVD/USB Module (Illustrates installing in a SPARC Enterprise T5120 server)



2. **Slide the pull tab back into the system.**
3. **Install the hard drive you removed during the DVD/USB module removal procedure.**
4. **Plug in the power cords.**

   See "Connect Power Cords to the Server" on page 178.
5. **Power on the system.**

   See "Power On the Server Using the `poweron` Command" on page 179 or "Power On the Server Using the Front Panel Power Button" on page 180.

Related Information

- "Remove the DVD/USB Module" on page 139
- "Servicing the Hard Drive Backplane" on page 152

Servicing Fan Power Boards

These topics explain how to remove and install fan power boards.

- "Fan Power Board Overview" on page 143
- "Remove the Fan Power Board" on page 143
- "Install the Fan Power Board" on page 145

Related Information

- "Remove the Hard Drive Backplane" on page 152

Fan Power Board Overview

Fan power boards carry power to the system fan modules. They also contain fan module status LEDs and carry status and control data for the fan modules.

You must remove both fan power boards in order to access the following components:

- Paddle card
- (Sun SPARC Enterprise T5220 server) Hard drive data cables

Related Information

- "Remove the Fan Power Board" on page 143
- "Install the Fan Power Board" on page 145
- "Servicing Paddle Cards" on page 171

▼ Remove the Fan Power Board

If you are removing the fan power boards to access the paddle card or hard drive cage, you must remove the server from the rack. See "Remove the Server From the Rack" on page 64.

1. **Power off the server.**

   See "Removing Power From the System" on page 60.

2. **Disconnect the power cables.**

   See "Disconnect Power Cords From the Server" on page 62.

3. **Extend the server into the maintenance position.**

   See "Extend the Server to the Maintenance Position" on page 63.

Note – If you are removing the fan power boards to service the paddle card or hard drive cage, you must remove the server from the rack. See the topic "Remove the Server From the Rack" on page 64.

---

4. **Attach an antistatic wrist strap.**

5. **Remove the top cover.**

   See "Remove the Top Cover" on page 67.

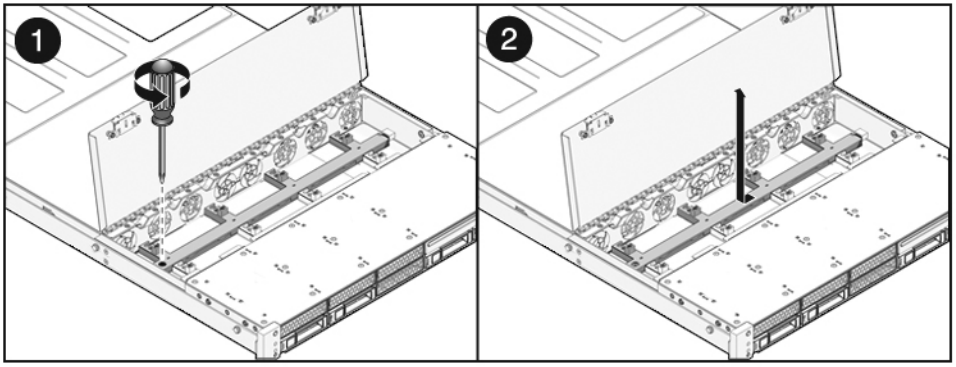
6. **Remove the fan modules.**

Note – If you are replacing a defective fan power board, remove only the fan modules needed to access the fan power board.

   See "Remove a Fan Module" on page 125.

7. **Remove the Phillips screw that secures the fan power board to the chassis.**

FIGURE: Removing the Fan Power Board (Illustrates removal from a Sun SPARC Enterprise T5120 server)



8. **Slide the fan power board to the left to disengage it from the paddle card.**

9. **Remove the fan power board from the system and place it on an antistatic mat.**

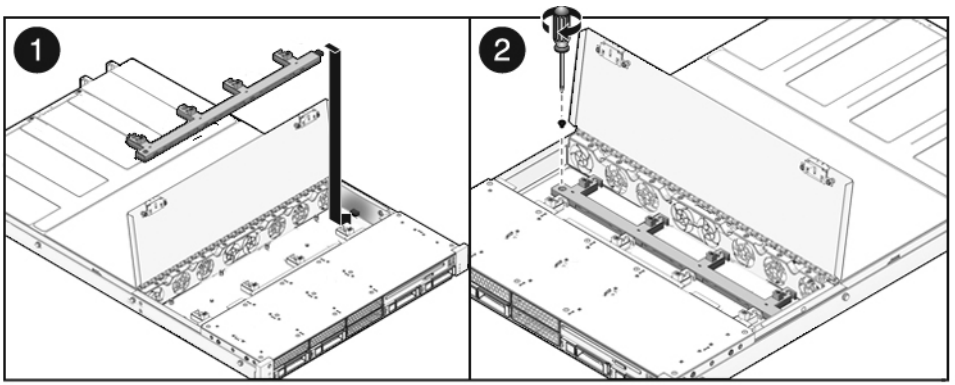
Related Information

- "Install the Fan Power Board" on page 145

▼ Install the Fan Power Board

1. **Lower the board into its mushroom standoffs in the chassis floor and slide the board to the right into the paddle card.**

FIGURE: Installing a Fan Power Board (Illustrates installation in a Sun SPARC Enterprise T5120 server)



2. **Secure the board to the chassis with a Phillips screw.**
3. **Install the fan modules.**

   See "Install a Fan Module" on page 127.
4. **Install the top cover.**

   See "Install the Top Cover" on page 175.
5. **If the server has been removed from the rack, return it to the rack as described in** "Reinstall the Server in the Rack" on page 176**.**
6. **Slide the server into the rack.**

   See "Return the Server to the Normal Rack Position" on page 177.
7. **Connect the power cords.**

   See "Connect Power Cords to the Server" on page 178.
8. **Power on the system.**

   See "Power On the Server Using the `poweron` Command" on page 179 or "Power On the Server Using the Front Panel Power Button" on page 180.

Related Information

- “Remove the Fan Power Board” on page 143

Servicing the Hard Drive Cage

These topics explain how to remove and install the hard drive cage.

- “Hard Drive Cage Overview” on page 146
- “Remove the Hard Drive Cage” on page 146
- “Install the Hard Drive Cage” on page 149

Related Information

- “Remove the Hard Drive Backplane” on page 152
- “Remove the Front Control Panel Light Pipe Assemblies” on page 157

Hard Drive Cage Overview

The hard drive cage is the mechanical assembly that contains the system hard drives, DVD/USB module, and hard drive backplane.

You must remove the hard drive cage to access the following components:

- Hard drive backplane
- Front control panel light pipe assemblies

Related Information

- “Remove the Hard Drive Cage” on page 146
- “Install the Hard Drive Cage” on page 149
- “Remove the Hard Drive Backplane” on page 152
- “Remove the Front Control Panel Light Pipe Assemblies” on page 157

▼ Remove the Hard Drive Cage

1. **Power off the system.**

   See“Removing Power From the System” on page 60 .

2. **Disconnect all external cables.**

3. **Remove the server from the rack. Place the server on a hard, flat surface.**

   See "Remove the Server From the Rack" on page 64.

4. **(SPARC Enterprise T5120) Remove the inner glides from the server.**

   Each inner glide is secured with a locking tab. Release the tab and slide each inner glide off the server mounting studs.

5. **Attach an antistatic wrist strap.**

6. **Remove the top cover.**

   See "Remove the Server From the Rack" on page 64.

7. **If you are servicing the hard drive backplane, remove all hard drives.**

   See "Remove a Hard Drive" on page 71.

Note – Make a note of the drive locations before removing them. You will need to install the hard drives in the same locations when reassembling the system.

---

8. **If you are servicing the hard drive backplane, remove the DVD/USB module.**

   See "Remove the DVD/USB Module" on page 139.

9. **(Sun SPARC Enterprise T5120 server, 8-HDD model) Remove the following items:**

   - Fans in locations /SYS/FANBD0/FM0 through /SYS/FANBD0/FM3.

     See "Fan Module Overview" on page 123.

   - Hard drive data cables from the hard drive cage.

10. **(Sun SPARC Enterprise T5220 server) Remove the fan modules.**

    See "Remove a Fan Module" on page 125.

11. **(Sun SPARC Enterprise T5220 server) Remove the fan power boards.**

    See "Remove the Fan Power Board" on page 143.

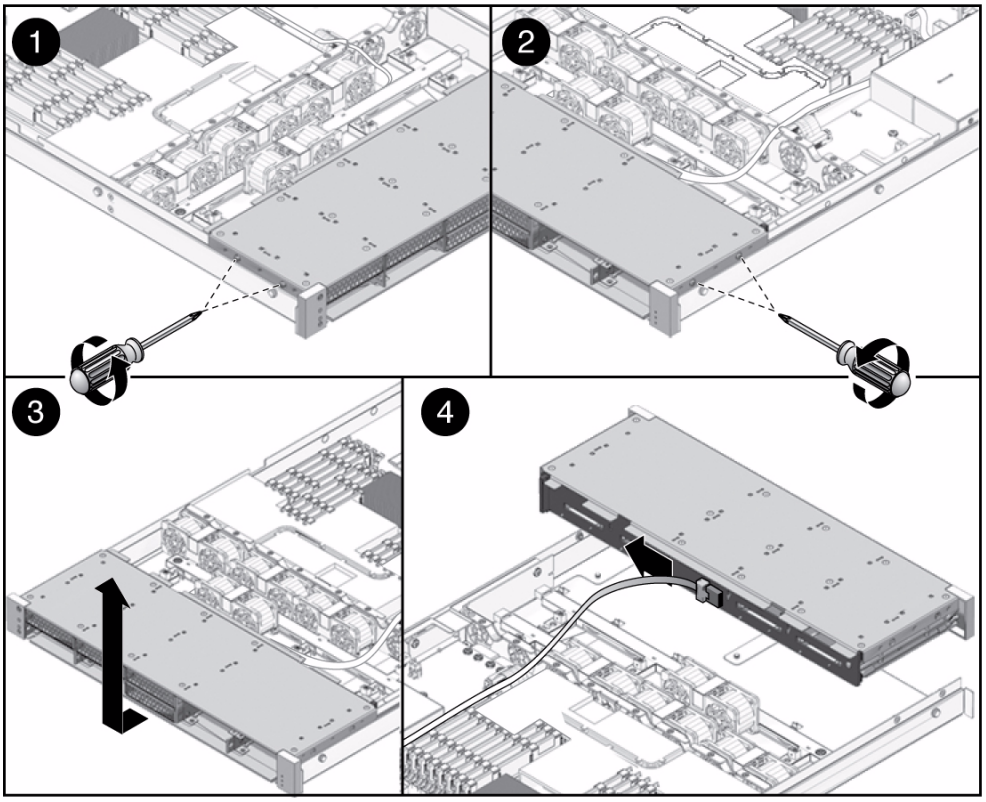
12. **Remove the No. 2 Phillips screws securing the hard drive cage to the chassis.**

    Two screws secure the disk cage to each side of the chassis. See panels 1 and 2 in the following figure.

13. **Slide the hard drive cage forward to disengage the backplane from the paddle cards.**

    See panel 3 in the following figure.

FIGURE: Removing a Hard Drive Cage (Illustrating Removal From a Sun SPARC Enterprise T5120 Server)



14. **Disconnect the hard drive data cables.**

    a. **Press the release button.**

    b. **Remove the plug from the connector on the hard drive backplane.**

    See panel 4 in the preceding figure.

Caution – The hard drive data cables are delicate. Ensure that they are safely out of the way when servicing the motherboard.

15. **Lift the hard drive cage up and out of the chassis.**
16. **Set the hard drive cage on an antistatic mat.**

Related Information

- "Install the Hard Drive Cage" on page 149

- "Remove the Hard Drive Backplane" on page 152

▼ Install the Hard Drive Cage

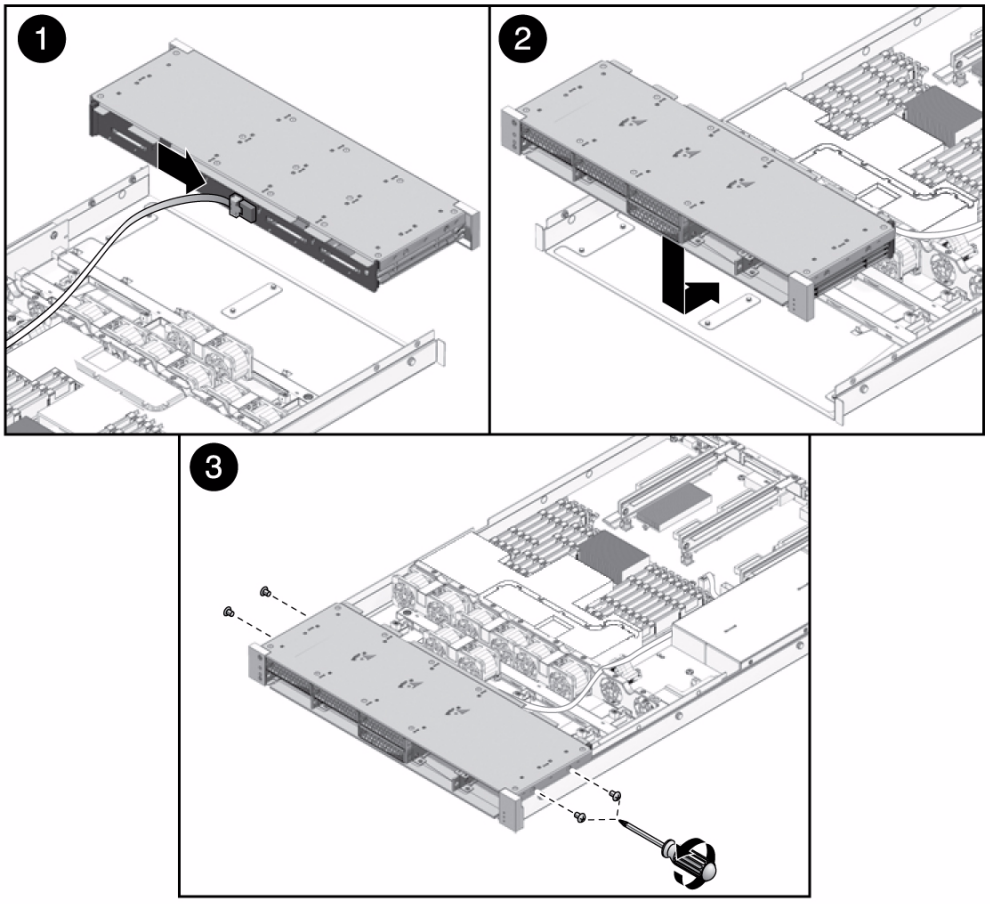
Before performing any installation steps, review the proper cable routing and connections. The following topics contain detailed cable routing information.

- "Internal Cables for Onboard SAS Controller Cards in SPARC Enterprise T5120 Servers" on page 188
- "Internal Cables for Onboard SAS Controller Cards in Sun SPARC Enterprise T5220 Servers" on page 202

1. **Position the hard drive cage in the chassis, over the chassis standoffs.**

   This is shown in the following figure.

FIGURE: Installing a Hard Drive Cage (Illustrating Installation in a Sun SPARC Enterprise T5220 Server)



2. **Connect the hard drive data cables (panel 1).**

   Follow the proper cable routing for your server model. See the HDD cable routing diagrams in the following topics:

   - "Internal Cables for Onboard SAS Controller Cards in SPARC Enterprise T5120 Servers" on page 188
   - "Internal Cables for Onboard SAS Controller Cards in Sun SPARC Enterprise T5220 Servers" on page 202

   Press the plug into its socket until the plug snaps into place.

Note – If the cables do not reach the hard drive cage, perform this step after Step 4.

---

3. **(Sun SPARC Enterprise T5120 server, 8 disk-capable) Remove fan FM1.**

4. **Slide the hard drive cage back until the hard drive backplane engages with the paddle card connector.**

Caution – Use care when installing the hard drive cage in the chassis. Align the hard drive cage with the base of the chassis before sliding the cage back. This care is needed to avoid damaging components.

5. **Replace the No. 2 Phillips screws securing the hard drive cage to the chassis.**

   Two screws secure the disk cage to each side of the chassis.

6. **(Sun SPARC Enterprise T5220 server) Install the fan power boards.**

   See "Install the Fan Power Board" on page 145.

7. **(Sun SPARC Enterprise T5220 and Sun SPARC Enterprise T5120 8-disk capable servers) Install the fan modules.**

   See "Install a Fan Module" on page 127.

8. **Install the top cover.**

   See "Install the Top Cover" on page 175.

9. **(Sun SPARC Enterprise T5120) Install the inner glides.**

   Slide each inner glide onto the mounting studs on the server until the glide snaps into place.

10. **(Sun SPARC Enterprise T5120) Install the server into the rack.**

    See "Reinstall the Server in the Rack" on page 176.

11. **Install the hard drives.**

Note – Take care to be certain you are installing the hard drives in the correct drive bays.

See"Install a Hard Drive" on page 73 .

12. **Install the DVD/USB module.**

    See "Install the DVD/USB Module" on page 141.

13. **Connect the power cords.**

Note – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

14. **Power on the system.**

    See "Power On the Server Using the `poweron` Command" on page 179.

Related Information

- "Remove the Hard Drive Cage" on page 146

Servicing the Hard Drive Backplane

These topics explain how to remove and install hard drive backplanes.

- "Hard Drive Backplane Overview" on page 152
- "Remove the Hard Drive Backplane" on page 152
- "Install the Hard Drive Backplane" on page 154

Hard Drive Backplane Overview

The hard drive backplane is housed in the hard drive cage. It provides data and control signal connectors for the hard drives. It also provides the interconnect for the front I/O board, power and locator buttons, and system/component status LEDs.

Note – Each drive has its own Power/Activity, Fault, and Ready-to-Remove LEDs.

Related Information

- "Remove the Hard Drive Backplane" on page 152
- "Install the Hard Drive Backplane" on page 154

▼ Remove the Hard Drive Backplane

1. **Remove the hard drive cage.**

   See "Remove the Hard Drive Cage" on page 146.

2. **Remove the No. 1 Phillips screws securing the backplane to the hard drive cage.**

   - Two screws secure the backplane in the Sun SPARC Enterprise T5120 server. See the first figure below.

- Four screws secure the backplane in the Sun SPARC Enterprise T5220 server. See the second figure below.

FIGURE: Removing a Hard Drive Backplane (Illustrating removal from a Sun SPARC Enterprise T5120 server)

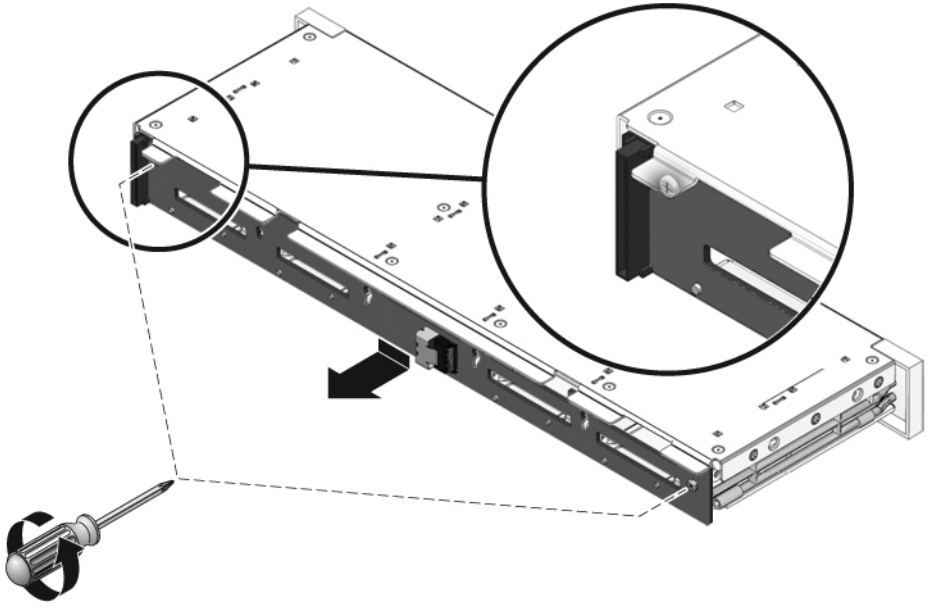
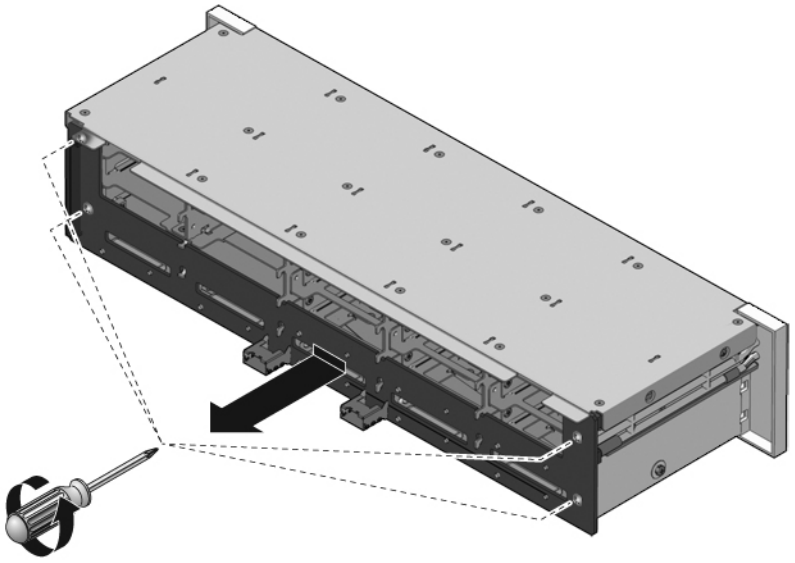


FIGURE: Removing a Hard Drive Backplane (Illustrating removal from a Sun SPARC Enterprise T5220 server)



3. **Slide the backplane down and off the hard drive cage retention hooks.**
4. **Place the hard drive backplane on an antistatic mat.**

Related Information

- "Install the Hard Drive Backplane" on page 154

▼ Install the Hard Drive Backplane

1. **Slide the backplane under the retention hooks on the hard drive cage.**
2. **Install the No. 1 Phillips screws that secure the backplane to the hard drive cage.**
   - Two screws secure the backplane in the Sun SPARC Enterprise T5120 server. See the first figure below.
   - Four screws secure the backplane in the Sun SPARC Enterprise T5220 server. See the second figure below.

FIGURE: Installing a Hard Drive Backplane in a Sun SPARC Enterprise T5120 Server

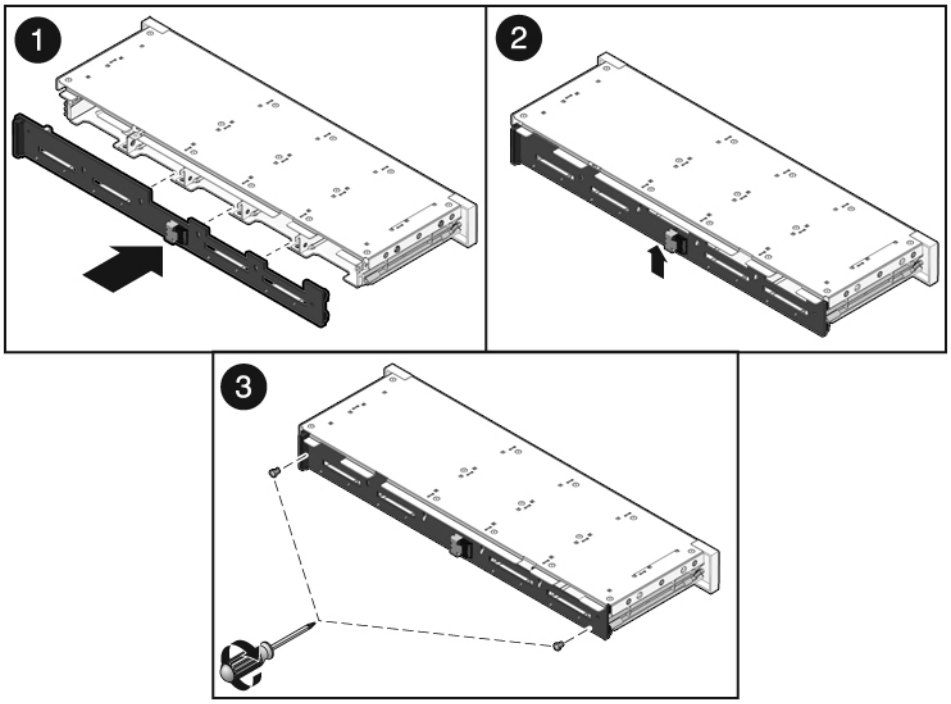
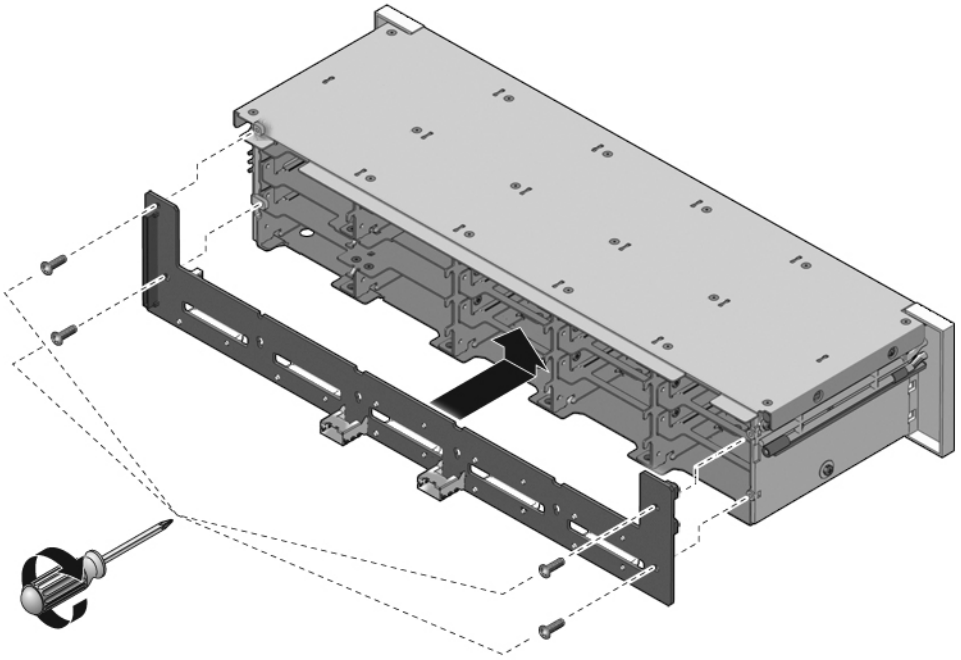


FIGURE: Installing a Hard Drive Backplane in a Sun SPARC Enterprise T5220 Server



3. **Install the hard drive cage.**

   See "Install the Hard Drive Cage" on page 149.

Related Information

- "Remove the Hard Drive Backplane" on page 152

Servicing Front Control Panel Light Pipe Assemblies

These topics explain how to remove and install front control panel light pipe assemblies.

- "Front Control Panel Light Pipe Assemblies Overview" on page 157
- "Remove the Front Control Panel Light Pipe Assemblies" on page 157
- "Install the Front Control Panel Light Pipe Assemblies" on page 158

Front Control Panel Light Pipe Assemblies Overview

The front control panel light pipe assemblies are mounted on each side of the hard drive cage. You must remove the hard drive cage to access the screws that attach the light pipe assemblies to the hard drive cage.

▼ Remove the Front Control Panel Light Pipe Assemblies

1. **Remove the hard drive cage.**

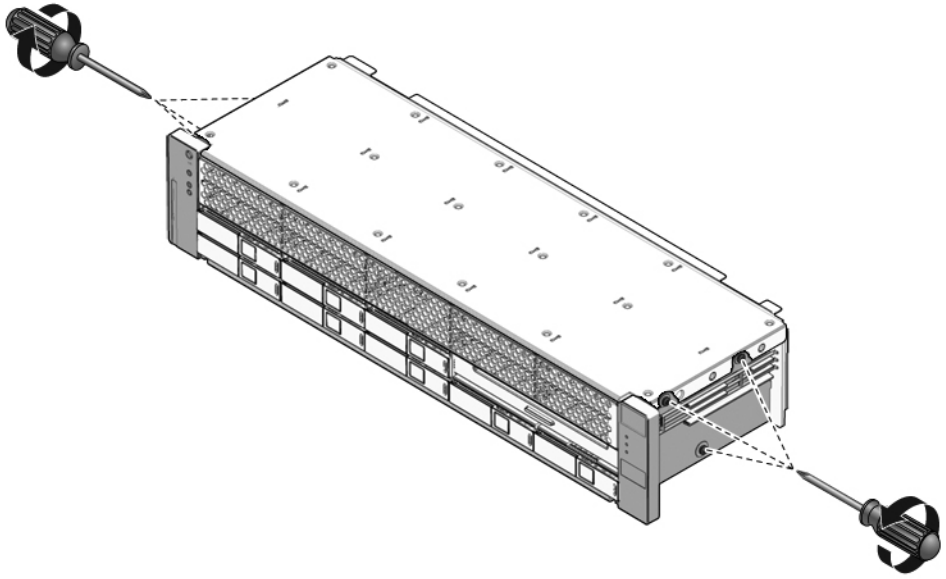
   See "Remove the Hard Drive Cage" on page 146.

2. **Remove the No. 1 Phillips screws securing the front control panel light pipe assembly to the hard drive cage.**

   - Two screws secure the assembly to the hard drive cage in the Sun SPARC Enterprise T5120 server.
   - Three screws secure the assembly to the hard drive cage in the Sun SPARC Enterprise T5220 server.

   The following figure illustrates installation of the front control panel light pipe on a Sun SPARC Enterprise T5220 server. Except for minor differences, such as the number of screws, installation is the same for Sun SPARC Enterprise T5120 servers.

FIGURE: Removing the Front Control Panel Light Pipe Assembly From a Sun SPARC Enterprise T5220 Server



3. **Slide the light pipe assembly out of the control panel.**

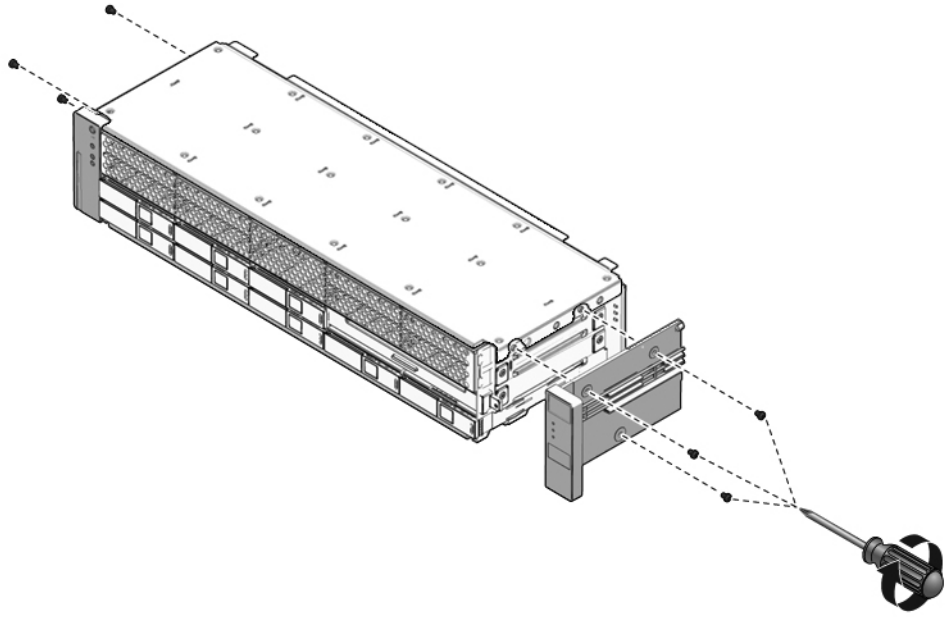
Related Information

- "Install the Front Control Panel Light Pipe Assemblies" on page 158
- "Remove the Hard Drive Cage" on page 146

▼ Install the Front Control Panel Light Pipe Assemblies

1. **Insert the light pipe assembly into the control panel.**
2. **Align the control panel light pipe assembly with the mounting holes on the hard drive cage.**
   - Two screws secure the assembly to the hard drive cage in the Sun SPARC Enterprise T5120 server. See the first figure below.
   - Three screws secure the assembly to the hard drive cage in the Sun SPARC Enterprise T5220 server. See the second figure below.

FIGURE: Installing a Front Control Panel Light Pipe Assembly in a Sun SPARC Enterprise T5220 Server



3. **Secure the light pipe assembly with the No. 1 Phillips screws.**
   - Two screws secure the assembly to the hard drive cage in the Sun SPARC Enterprise T5120 server.
   - Three screws secure the assembly to the hard drive cage in the Sun SPARC Enterprise T5220 server.
4. **Install the hard drive cage.**

   See "Install the Hard Drive Cage" on page 149.

Related Information

- "Remove the Front Control Panel Light Pipe Assemblies" on page 157

Servicing Power Distribution Boards

The following topics explain how to remove and install power distribution boards. They also provide important safety information related to working with power distribution boards.

- "Power Distribution Board Overview" on page 160
- "Remove the Power Distribution Board" on page 161
- "Install the Power Distribution Board" on page 163

Related Information

- ."Servicing Power Supply Backplanes (Sun SPARC Enterprise T5220 Servers)" on page 167

Power Distribution Board Overview

The power distribution board distributes main 12V power from the power supplies to the rest of the system. It is directly connected to the paddle card and to the motherboard by means of a bus bar and ribbon cable. This board also supports a top cover safety interlock ("kill") switch.

It is easier to service the power distribution board with the bus bar assembly attached. If you are replacing a faulty power distribution board, you must remove the bus bar assembly from the old board and attach the assembly to the new power distribution board.

If you replace a faulty power distribution board, you must program the new power distribution board with the chassis serial number and part number. These numbers are needed for obtaining product support.

Caution – The system supplies power to the power distribution board even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect power cords before servicing the power distribution board.

▼ Remove the Power Distribution Board

1. **Note the chassis serial number and part number.**

   The chassis serial number and server part number are printed on a label affixed to the side of the chassis.

2. **Remove the motherboard assembly.**

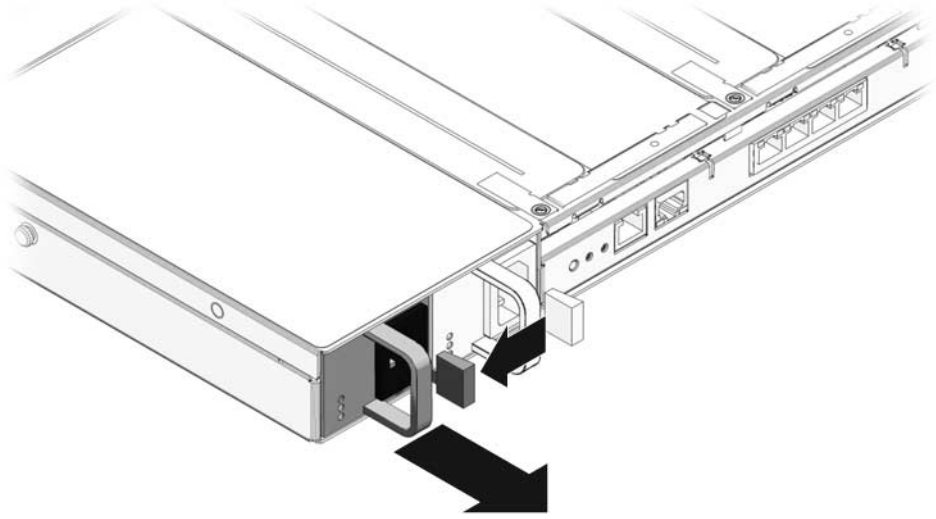
   See "Remove the Motherboard Assembly" on page 118..

3. **(Sun SPARC Enterprise T5120 server) Remove all power supplies.**

   a. **Grasp the power supply handle and press the release latch. See the following figure.**

   b. **Slide the power supply out of the system.**

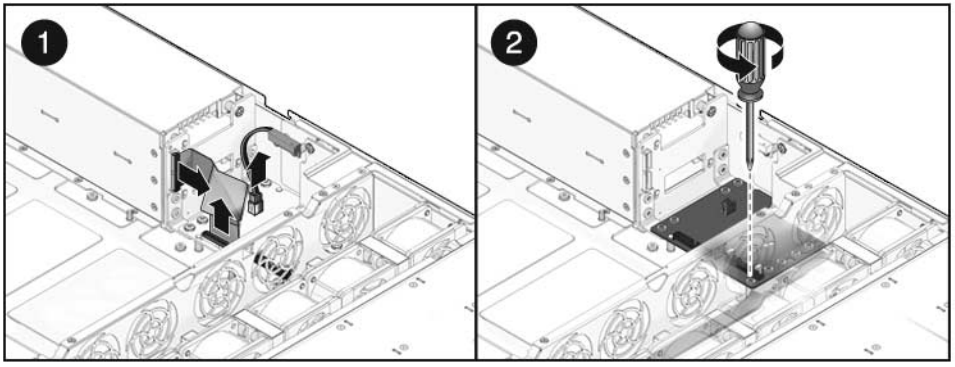
FIGURE: Removing a Power Supply From a Sun SPARC Enterprise T5120 Server



4. **Disconnect the top cover interlock cable from the power distribution board.**

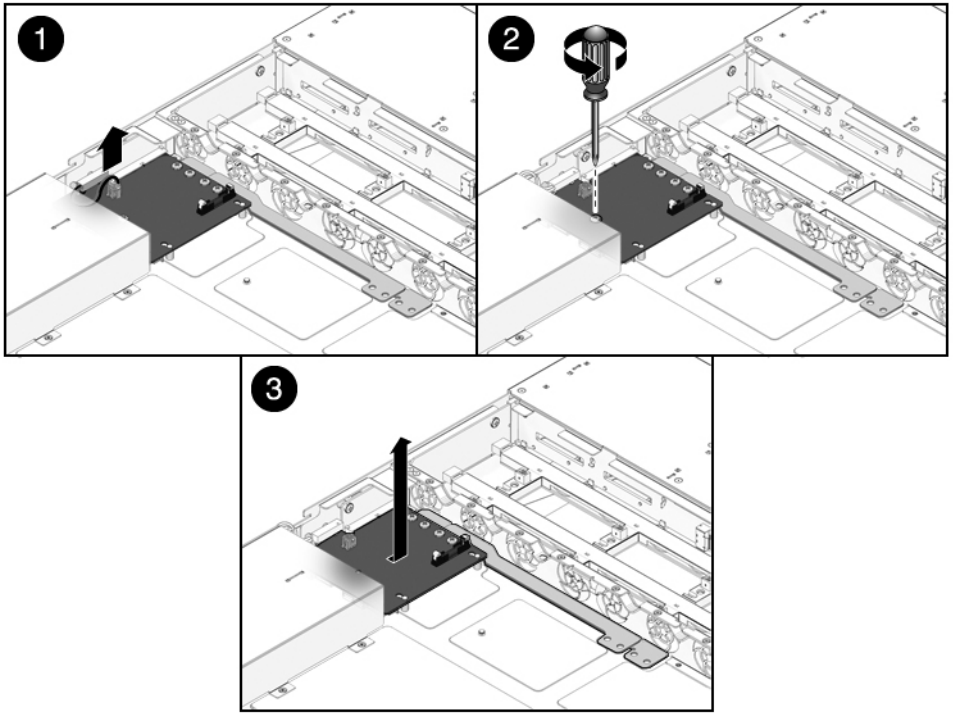
5. **(Sun SPARC Enterprise T5220 server) Disconnect the ribbon cable between the power distribution board and the power supply backplane. See Panel 1 in the following figure.**

FIGURE: Removing a Power Distribution Board From a Sun SPARC Enterprise T5220 Server



6. **(SPARC Enterprise T5220 server) Remove the four No. 2 Phillips screws securing the power distribution board to the power supply backplane. See Panel 2 in the previous figure.**
7. **Remove the No. 2 Phillips screw securing the power distribution board to the chassis.**

FIGURE: Removing the Power Distribution Board From a Sun SPARC Enterprise T5120 Server



8. **Grasp the bus bar and pull the power distribution board/bus bar assembly to the left, away from the paddle card.**
9. **Lift the power distribution board/bus bar assembly up and out of the system.**
10. **Place the power distribution board/bus bar assembly on an antistatic mat.**

Related Information

- "Install the Power Distribution Board" on page 163

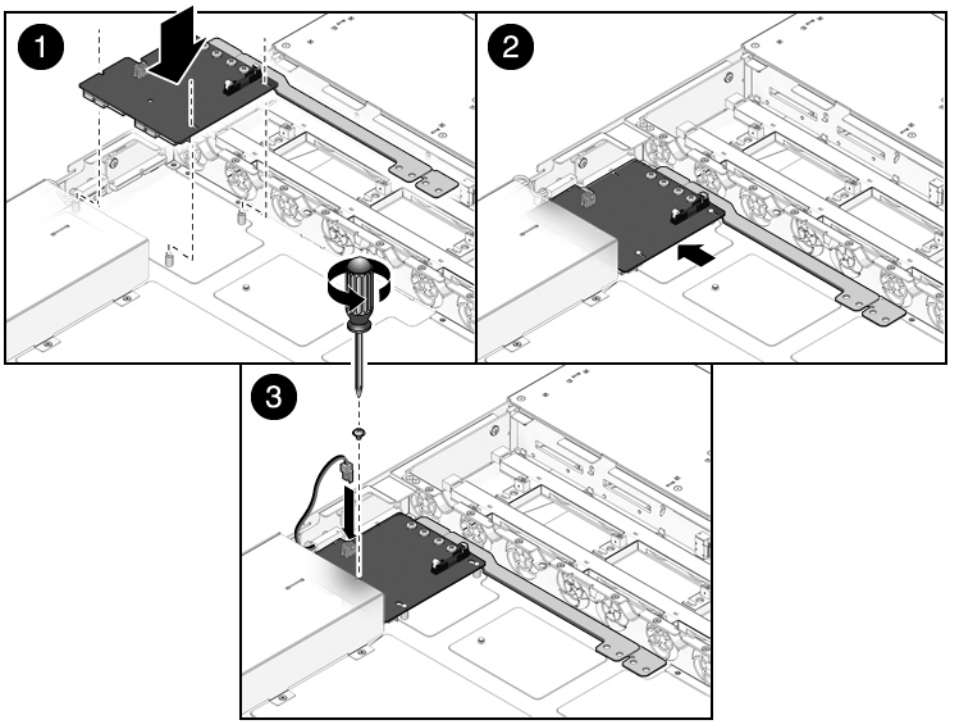
▼ Install the Power Distribution Board

1. **Lower the power distribution board/bus bar assembly into the chassis.**

   The power distribution board fits over a set of mushroom standoffs in the floor of the chassis.

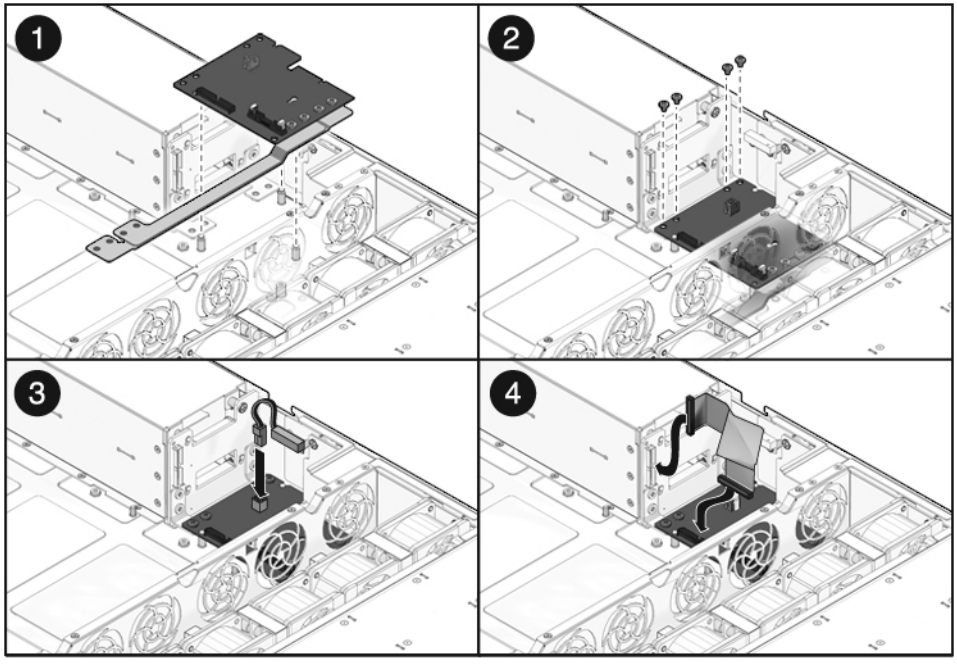
2. **Slide the power distribution board/bus bar assembly to the right, until it plugs into the paddle card.**

FIGURE: Installing a Power Distribution Board in a Sun SPARC Enterprise T5120 Server



3. **Install the No. 2 Phillips screw to secure the power distribution board to the chassis.**
4. **(Sun SPARC Enterprise T5220 server) Attach the four No. 2 Phillips screws securing the power distribution board to the power supply backplane.**

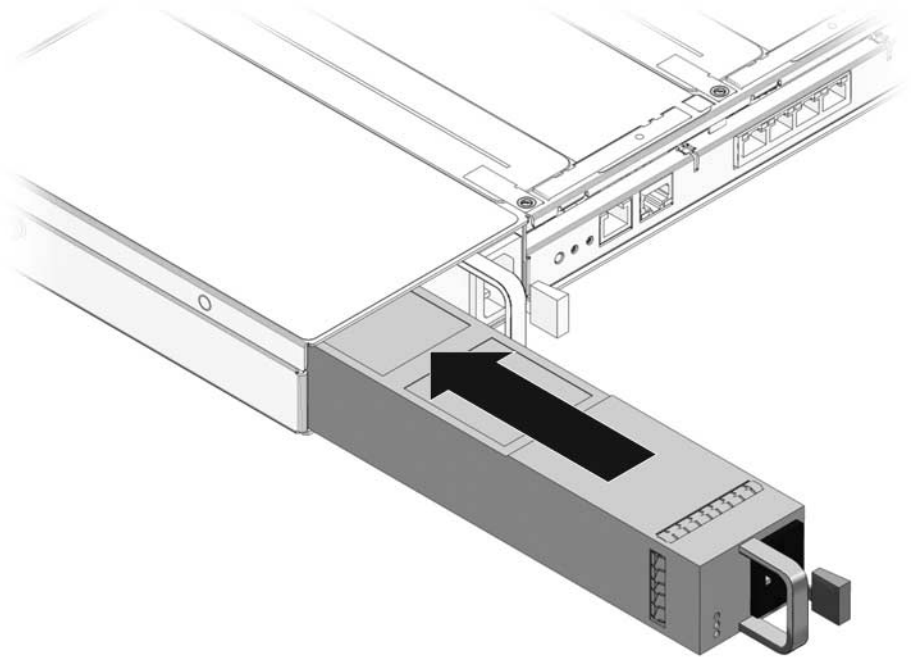
FIGURE: Installing a Power Distribution Board in a Sun SPARC Enterprise T5220 Server



5. **(Sun SPARC Enterprise T5220 server) Connect the power supply backplane ribbon cable to its plug on the power distribution board.**
6. **Connect the top cover interlock cable to the power distribution board.**
7. **(Sun SPARC Enterprise T5120 server) Install the power supplies.**

   Slide each power supply into its bay until the power supply locks into place.

FIGURE: Installing a Power Supply in a Sun SPARC Enterprise T5120 Server



8. **Install the motherboard assembly.**

   See "Install the Motherboard Assembly" on page 120..

Note – After replacing the power distribution board and powering on the system, you must run the ALOM CMT `setcsn` and `setcpn` commands to set the electronically readable chassis serial number and server part number.

---

9. **At the ALOM CMT command line interface, use the `setcsn` command to set the chassis serial number and the `setcpn` command to set the server part number on the power distribution board.**

   The following is an example of the command-line dialog used to set the chassis serial number and server part number for a Sun SPARC Enterprise T5120 server.

Caution – When performing the following steps, use special care to enter the correct numbers. Once the power distribution board has been programmed with a chassis serial number or server part number, the number cannot be changed.

```
sc> setsc sc_servicemode true
Warning: misuse of this mode may invalidate your warranty.
sc> setcsn -c chassis_serial_number
Are you sure you want to permanently set the Chassis Serial Number
to chassis_serial_number [y/n]? y
setcsn: Chassis serial number recorded.
sc> setcpn -p chassis_part_number
Are you sure you want to permanently set the Chassis Part Number
to chassis_part_number [y/n]? y
setcpn: Chassis part number recorded.
sc> showplatform
SPARC-Enterprise-T5120
Chassis Serial Number: chassis-serial-number
Domain Status
------ ------
SO Running
sc> setsc sc_servicemode false
```

Related Information

- "Remove the Power Distribution Board" on page 161

Servicing Power Supply Backplanes (Sun SPARC Enterprise T5220 Servers)

The following topics explain how to remove and install power supply backplanes in Sun SPARC Enterprise T5220 servers. Power supply backplanes are not used in Sun SPARC Enterprise T5120 servers.

- "Power Supply Backplane Overview" on page 168

Related Information

- ."Servicing Power Distribution Boards" on page 160

Power Supply Backplane Overview

The power supply backplane carries 12V power from the power supplies to the power distribution board over a pair of bus bars.

Note – Sun SPARC Enterprise T5120 servers do not use a power supply backplane. In these systems, the power supplies connect directly to the power distribution board.

Caution – The system supplies standby power to the power supply backplane even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect the power cords before servicing the power supply backplane.

▼ Remove the Power Supply Backplane

Note the chassis serial number and server part number. They are printed on a label located on the side of the chassis.

1. **Remove the motherboard assembly.**

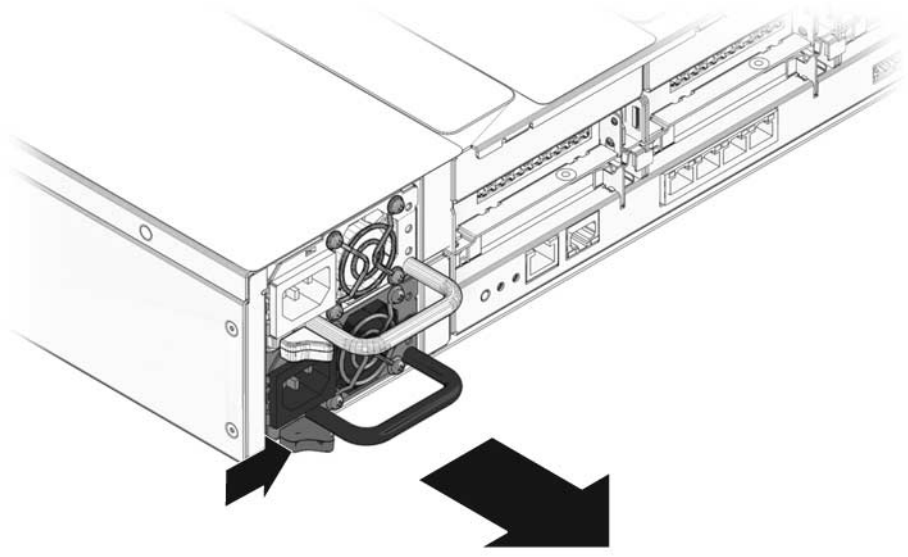
   See "Remove the Motherboard Assembly" on page 118..

2. **Remove the power supplies.**

   a. **Grasp the power supply handle and press the release latch.**

   b. **Slide the power supply out of the system. See the following figure.**

FIGURE: Removing a Power Supply From a Sun SPARC Enterprise T5220 Server



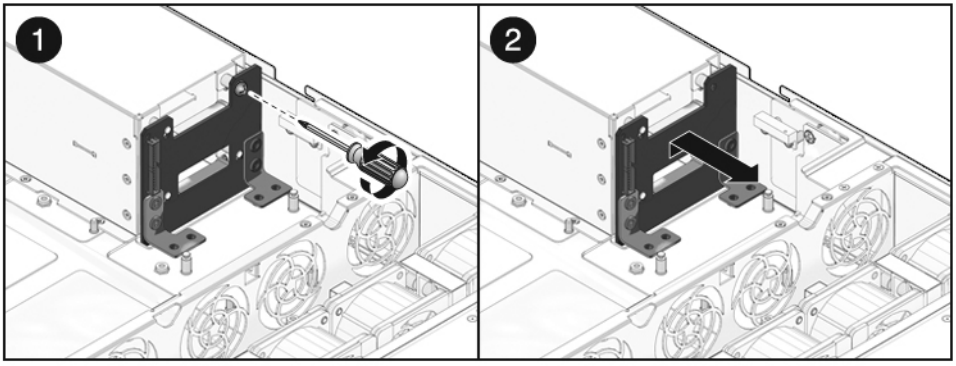
3. **Remove the power distribution board.**

   See "Remove the Power Distribution Board" on page 161.

4. **Remove the No. 2 Phillips screw securing the power supply backplane to the power supply bay.**

5. **Lift the power supply backplane up and off its standoffs and out of the system.**

FIGURE: Removing a Power Supply Backplane From a Sun SPARC Enterprise T5220 Server



6. **Place the power supply backplane on an antistatic mat.**

Related Information

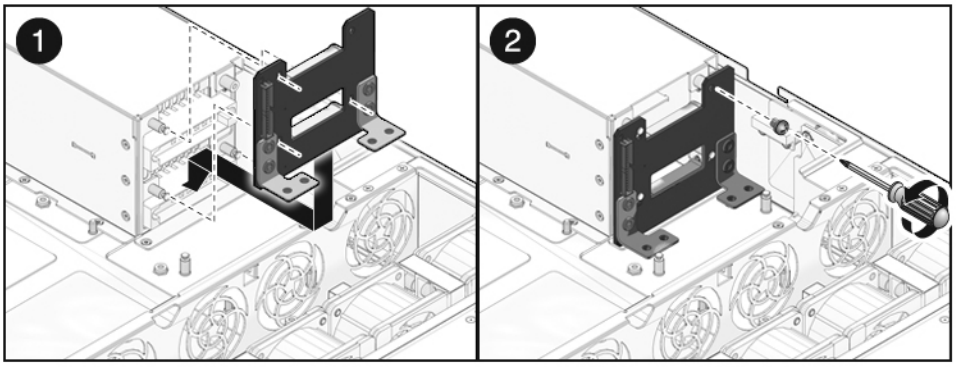
- "Install the Power Supply Backplane" on page 170

▼ Install the Power Supply Backplane

1. **Mount the power supply backplane to the front of the power supply bay.**

   Place the backplane over its standoffs. Press down toward the floor of the chassis. .

FIGURE: Installing a Power Supply Backplane (Illustrating an Installation in a Sun SPARC Enterprise T5220 Server)



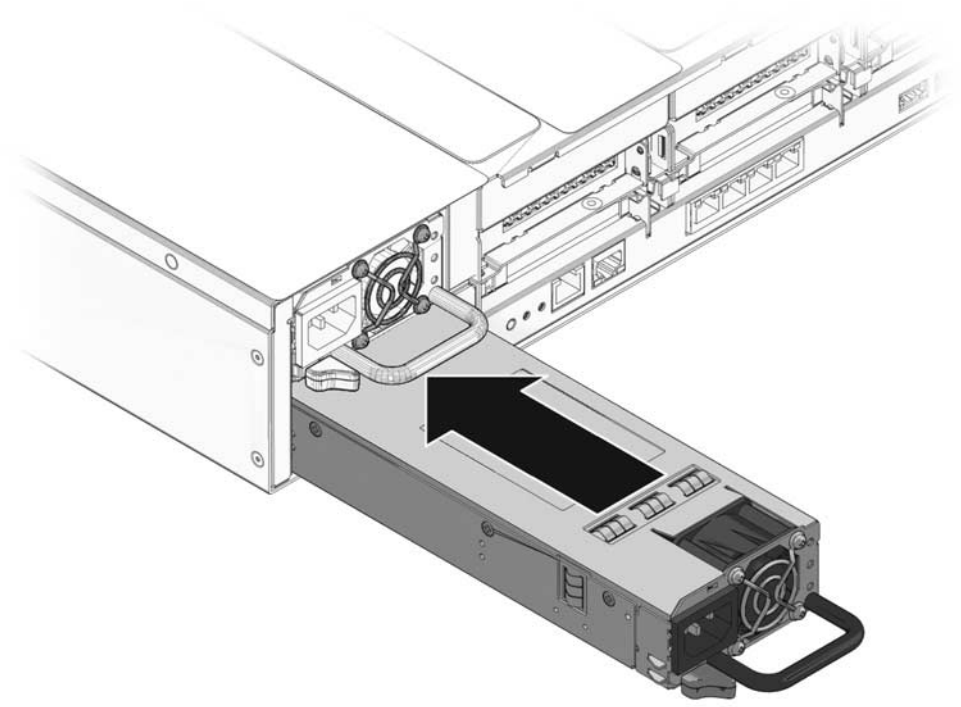
2. **Secure the power supply backplane with one No. 2 Phillips screw.**
3. **Install the power distribution board.**

   See "Install the Power Distribution Board" on page 163.

4. **Install the power supplies.**

   Slide each power supply into its bay until the power supply locks into place.

FIGURE: Installing a Power Supply (Illustrating Installation of a Power Supply in a Sun SPARC Enterprise T5220 Server)



5. **Install the motherboard assembly.**

   See "Install the Motherboard Assembly" on page 120.

Related Information

- "Remove the Power Supply Backplane" on page 168

Servicing Paddle Cards

These topics explain how to remove and install paddle cards in Sun SPARC Enterprise T5120 and T5220 servers.

- "Paddle Card Overview" on page 172
- "Remove the Paddle Card" on page 172
- "Install the Paddle Card" on page 173

Paddle Card Overview

The paddle card serves as the interconnect between the power distribution board and the fan power boards, hard drive backplane, and front panel I/O board.

Related Information

- "Remove the Paddle Card" on page 172

▼ Remove the Paddle Card

1. **Remove the motherboard assembly.**

   See "Remove the Motherboard Assembly" on page 118.

2. **Remove the power distribution board.**

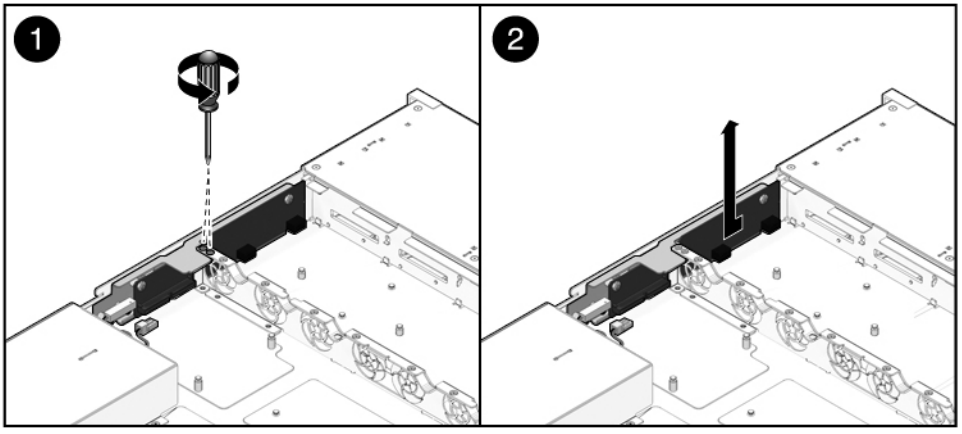
   See "Remove the Power Distribution Board" on page 161.

3. **Remove the fan power boards.**

   "Remove the Fan Power Board" on page 143.

4. **Remove the two No. 1 Phillips screws securing the paddle card to the chassis.**

FIGURE: Removing a Paddle Card (Illustrating Removal From a Sun SPARC Enterprise T5120 Server)



5. **Slide the paddle card back, away from its connector on the hard drive backplane.**

6. **Tilt the paddle card away from the side of the chassis and lift the paddle card up and out of the system.**

7. **Place the paddle card on an antistatic mat.**

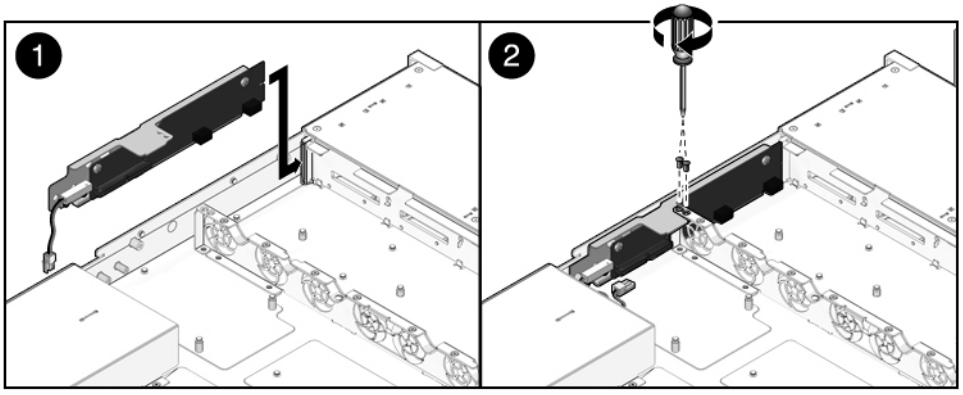
Related Information

- "Install the Paddle Card" on page 173

▼ Install the Paddle Card

1. **Lower the paddle card into the chassis.**

FIGURE: Installing a Paddle Card (Illustrating Installation Into a Sun SPARC Enterprise T5120 Server)



2. **Slide the paddle card forward to plug it into the hard drive backplane.**

3. **Secure the paddle card with two No. 1 Phillips screws.**

4. **Install the fan power boards.**

   See "Install the Fan Power Board" on page 145.

5. **Install the power distribution board.**

   See "Install the Power Supply Backplane" on page 170.

6. **Install the motherboard assembly.**

   See "Install the Motherboard Assembly" on page 120.

Related Information

- "Remove the Paddle Card" on page 172

Returning the Server to Operation

These topics explain how to return Sun SPARC Enterprise T5120 and T5220 servers to operation after you have performed service procedures.

- "Install the Top Cover" on page 175
- "Reinstall the Server in the Rack" on page 176
- "Return the Server to the Normal Rack Position" on page 177
- "Connect Power Cords to the Server" on page 178
- "Power On the Server Using the `poweron` Command" on page 179
- "Power On the Server Using the Front Panel Power Button" on page 180

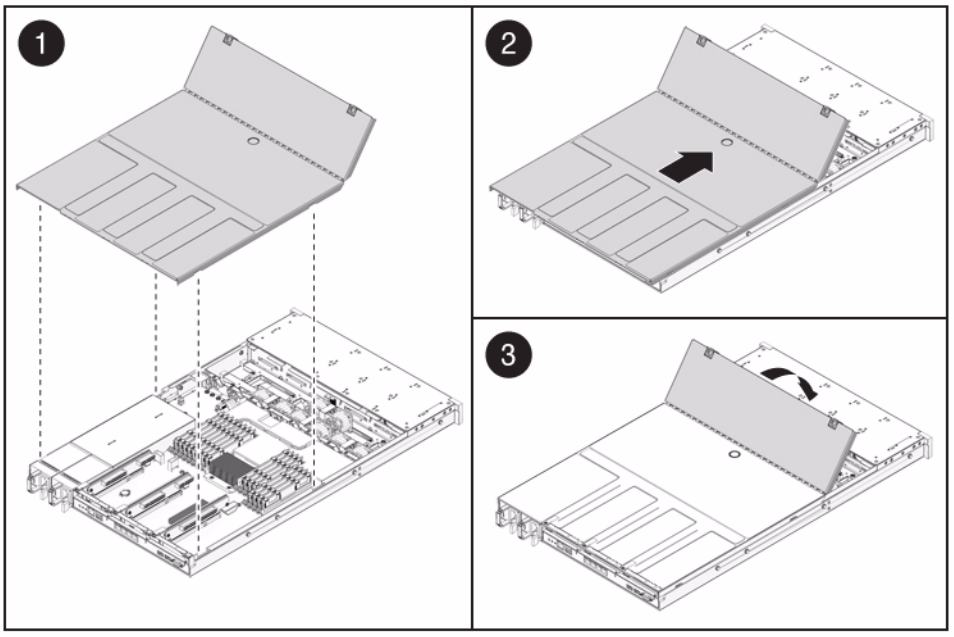
▼ Install the Top Cover

1. **Place the top cover on the chassis.**

   Set the cover down so that it hangs over the rear of the server by about an inch (25.4 mm).

2. **Slide the top cover forward until it seats.**

FIGURE: Installing the Top Cover



Note – If an emergency shutdown occurred when the top cover was removed, you must install the top cover and use the `poweron` command to restart the system. See "Power On the Server Using the `poweron` Command" on page 179 for more information about the `poweron` command.

Related Information

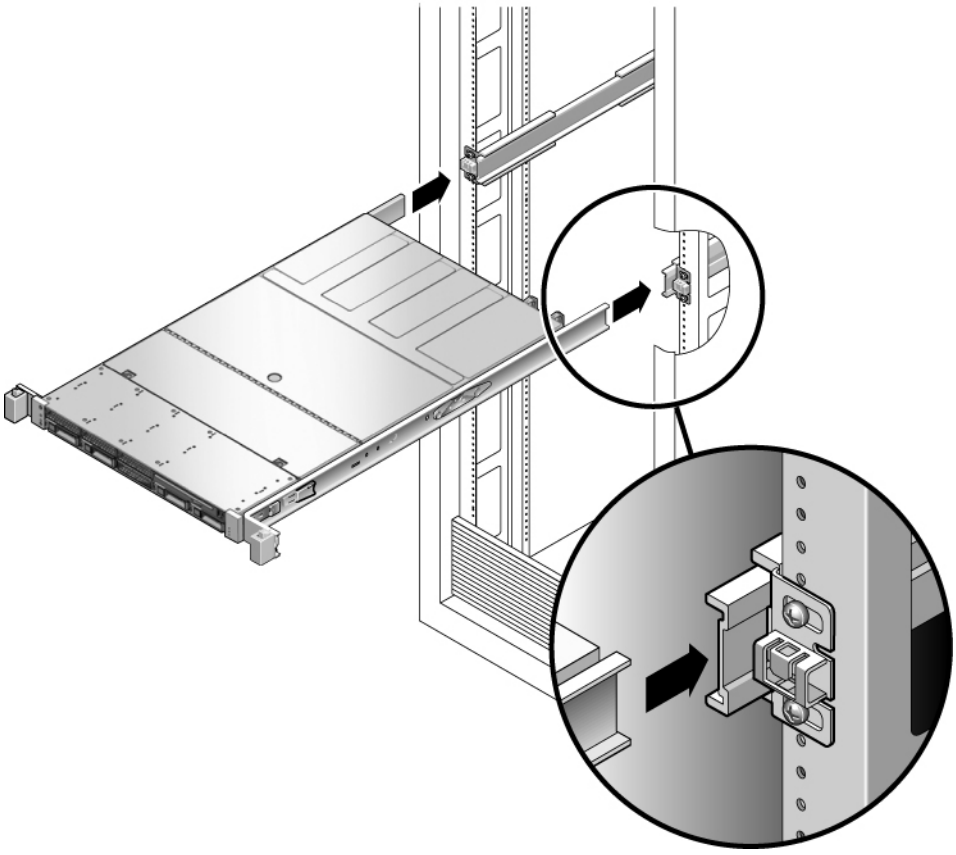
- "Power On the Server Using the `poweron` Command" on page 179

▼ Reinstall the Server in the Rack

Caution – The chassis is heavy. To avoid personal injury, use two people to lift it and set it in the rack.

1. **Place the ends of the chassis mounting brackets into the slide rails.**

FIGURE: Returning the Server to the Rack



2. **Slide the server into the rack until the brackets lock into place.**

   The server is now in the extended maintenance position.

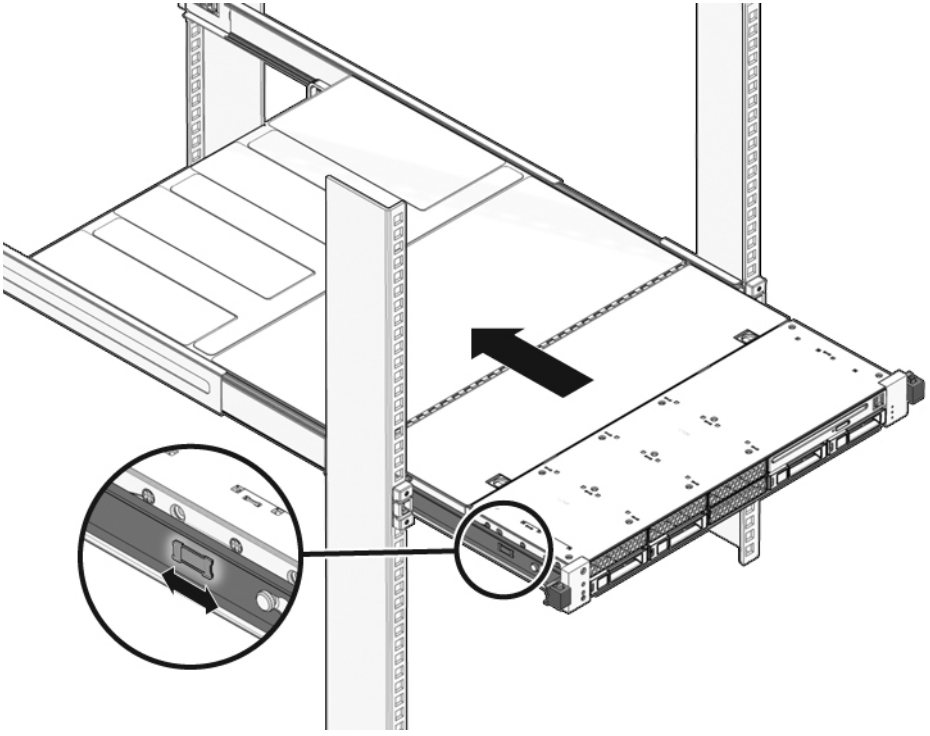
Related Information

- "Return the Server to the Normal Rack Position" on page 177

▼ Return the Server to the Normal Rack Position

1. **Release the slide rails from the fully extended position by pushing the release tabs on the side of each rail.**

FIGURE: Release Tabs on the Rail



2. **While pushing on the release tabs, slowly push the server into the rack.**

   Ensure that the cables do not get in the way.

3. **Reconnect the cables to the back of the server.**

   If the CMA is in the way, disconnect the left CMA release and swing the CMA open.

4. **Reconnect the CMA.**

   Swing the CMA closed and latch it to the left rack rail.

Related Information

- "Reinstall the Server in the Rack" on page 176

▼ Connect Power Cords to the Server

- **Reconnect both power cords to the power supplies.**

Note – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

Related Information

- "Power On the Server Using the `poweron` Command" on page 179
- "Power On the Server Using the Front Panel Power Button" on page 180

▼ Power On the Server Using the `poweron` Command

Note – If you are powering on the server following an emergency shutdown that was triggered by the top cover interlock switch, you must use the `poweron` command.

- **Type `poweron` at the service processor prompt.**

```
-> poweron
```

You will see an -> Alert message on the system console. This message indicates that the system is reset. You will also see a message indicating that the VCORE has been margined up to the value specified in the default `.scr` file that was previously configured. For example:

```
-> start /SYS
```

Related Information

- "Power On the Server Using the Front Panel Power Button" on page 180

▼ Power On the Server Using the Front Panel Power Button

- **Use a pointed object, such as a pen or pencil, to press the Power button on the front panel.**

  See "Power On the Server Using the Front Panel Power Button" on page 180 for more information on the Power button.

Related Information

- "Power On the Server Using the `poweron` Command" on page 179

Identifying FRUs in SPARC Enterprise T5120 Servers

These topics identify and illustrate Field Replaceable Units (FRUs) contained in Sun SPARC Enterprise T5120 servers.

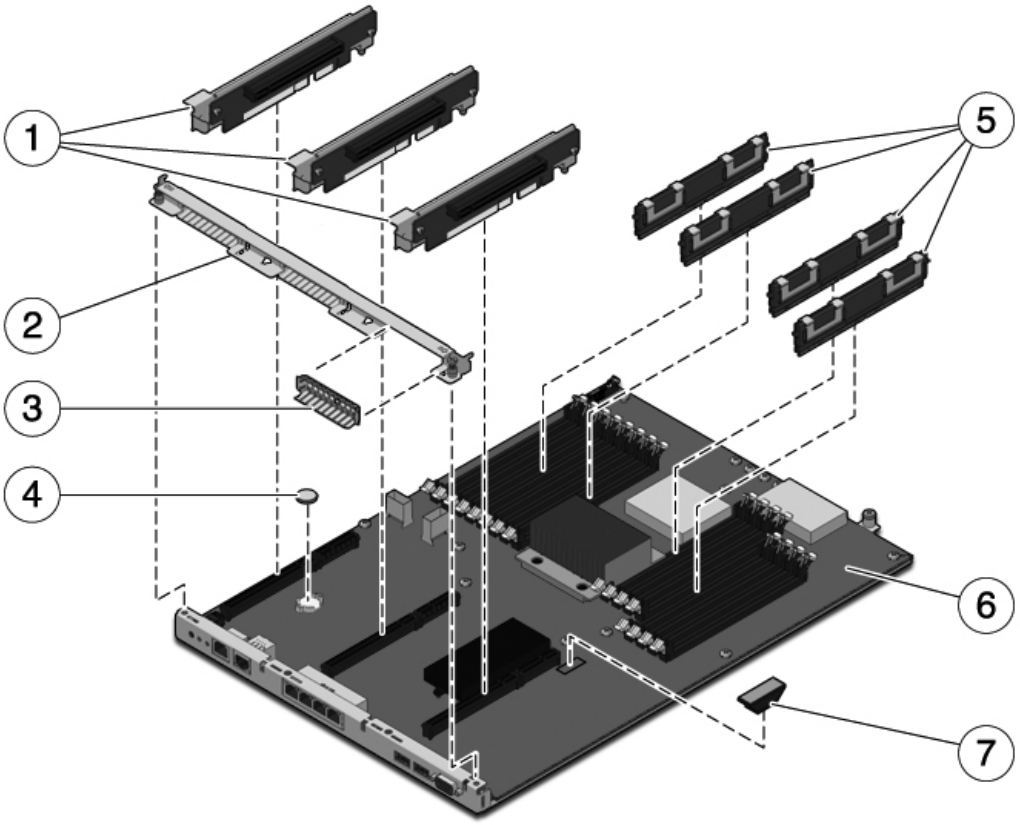
- "Motherboard Components in T5120 Servers" on page 182
- "I/O Components in SPARC Enterprise T5120 Servers" on page 184
- "Power Distribution/Fan Module Components in SPARC Enterprise T5120 Servers" on page 186
- "Internal Cables for Onboard SAS Controller Cards in SPARC Enterprise T5120 Servers" on page 188
- "HDD Data Cable Routing for SAS RAID Controller Cards in Four-Disk Capable SPARC Enterprise T5120 Servers" on page 191
- "HDD Data Cable Routing for SAS RAID Controller Cards in Eight-Disk Capable SPARC Enterprise T5120 Servers" on page 193

Related Information

- "Identifying FRUs in SPARC Enterprise T5220 Servers" on page 195

Motherboard Components in T5120 Servers

FIGURE: Motherboard Components (Sun SPARC Enterprise T5120 Servers)



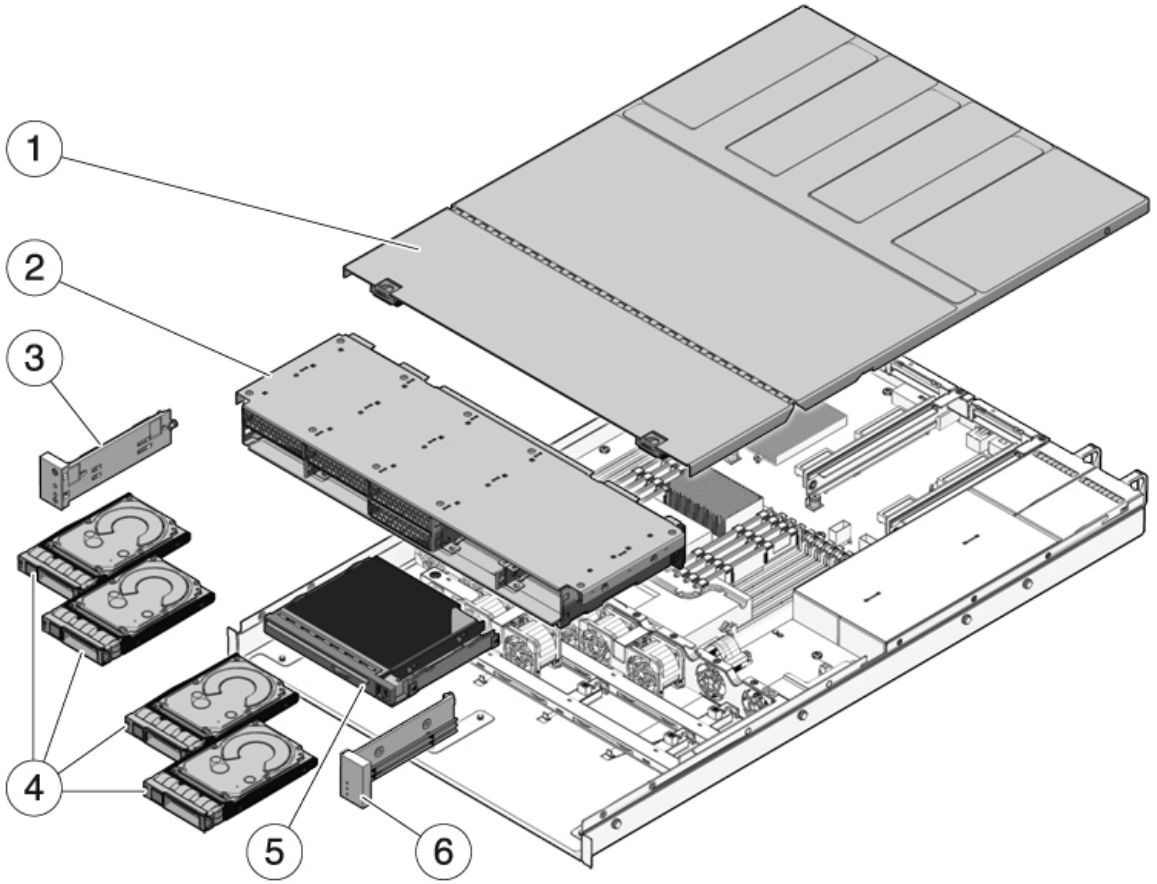
The following table identifies the components located on the motherboard and points to instructions for servicing them.

TABLE: Motherboard Components (SPARC Enterprise T5120 Servers)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	PCIe/XAUI risers	"Servicing PCIe/XAUI Risers" on page 102	Back panel PCI cross beam must be removed to access risers.	/SYS/MB/RISER0 /SYS/MB/RISER1 /SYS/MB/RISER2
2	Removable rear panel cross beam	"Servicing PCIe/XAUI Risers" on page 102	Remove this component to service PCIe/XAUI risers and cards.	N/A
3	PCIe filler panel	"Servicing PCIe/XAUI Risers" on page 102	Must be installed in blank PCI slots.	N/A
4	Battery	"Servicing the Battery" on page 112	Necessary for system clock and other functions.	/SYS/MB/V_VBAT
5	FB-DIMMs	"Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83 "Identify Faulty FB-DIMMs Using the FB-DIMM Fault Locator Button" on page 83	See configuration rules before upgrading FB-DIMMs.	See "FB-DIMM Configuration Guidelines" on page 95
6	Motherboard assembly	"Servicing the Motherboard Assembly" on page 117	Must be removed to access power distribution board and paddle card.	/SYS/MB
7	SCC module	"Servicing the SCC Module" on page 114	Contains host ID, MAC addresses, and service processor configuration data.	/SYS/MB/SC/SCC_NVRAM

I/O Components in SPARC Enterprise T5120 Servers

FIGURE: I/O Components (Sun SPARC Enterprise T5120 Servers)



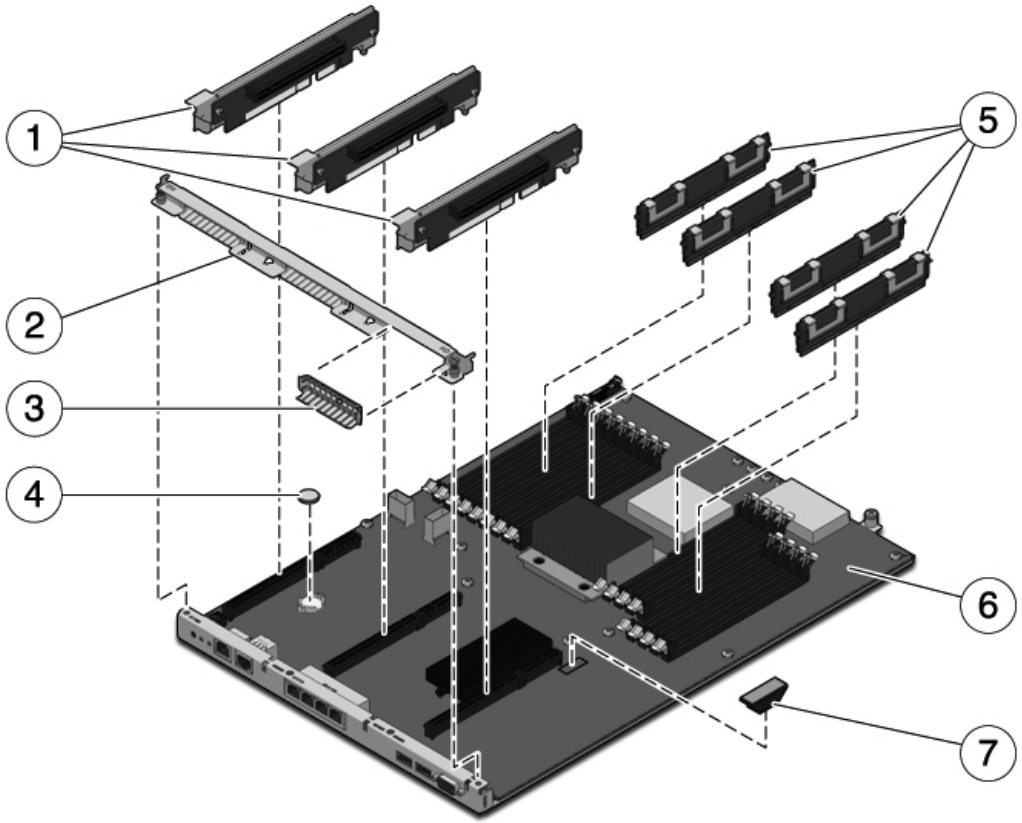
The following table identifies the I/O components in the server and points to instructions for servicing them.

TABLE: I/O Components (Sun SPARC Enterprise T5120 Servers)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Top cover	"Remove the Top Cover" on page 67 "Install the Top Cover" on page 175	Removing top cover while the system is running will cause an immediate shutdown.	N/A
2	Hard drive cage and hard drive backplane	"Servicing the Hard Drive Cage" on page 146 "Servicing the Hard Drive Backplane" on page 152	Must be removed to service hard drive backplane and front control panel light pipes.	/SYS/SASBP
3	Left control panel light pipe assembly	"Servicing Front Control Panel Light Pipe Assemblies" on page 156	Light pipe bracket is not a FRU.	N/A
4	Hard drives	"Servicing Hard Drives" on page 69	Hard drives must be removed to service the hard drive backplane.	See "Four-Drive Capable Backplane Configuration Reference" on page 77 or "Eight-Drive Capable Backplane Configuration Reference" on page 78
5	DVD/USB module	"Servicing DVD/USB Modules" on page 138	Must be removed to service the hard drive backplane.	/SYS/DVD /SYS/USBBD
6	Right control panel light pipe assembly	"Servicing Front Control Panel Light Pipe Assemblies" on page 156	Light pipe bracket is not a FRU.	N/A

Power Distribution/Fan Module Components in SPARC Enterprise T5120 Servers

FIGURE: Power Distribution/Fan Module Components (Sun SPARC Enterprise T5120 Servers)



The following table identifies the power distribution and fan module components in the server and points to instructions for servicing them.

TABLE: Power Distribution/Fan Module Components (Sun SPARC Enterprise T5120 Servers)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Power distribution board/bus bar	"Servicing Power Distribution Boards" on page 160	Bus bar is attached to the PDB with four screws. If replacing a defective PDB, you must move the bus bar to the new board and program the chassis serial number using the `setscn` command.	/SYS/PDB
2	Paddle card	"Servicing Paddle Cards" on page 171	Includes the top cover interlock switch.	/SYS/CONNBD
3	Power supplies	"Servicing Power Supplies" on page 129	Two power supplies provide N+1 redundancy.	/SYS/PS0 /SYS/PS1
4	Air duct	"Remove the Air Duct" on page 100 "Install the Air Duct" on page 101	Must be installed to provide proper cooling to the system.	N/A
5	Fan modules	"Servicing Fan Modules" on page 123	At least six fan modules must be installed in the server.	/SYS/FANBD0/FM0* /SYS/FANBD0/FM1 /SYS/FANBD0/FM2† /SYS/FANBD0/FM3‡ /SYS/FANBD1/FM0 /SYS/FANBD1/FM1 /SYS/FANBD1/FM2 /SYS/FANBD1/FM3
6	Fan power boards	"Servicing Fan Power Boards" on page 143	Must be removed to service the paddle card.	/SYS/FANBD0 /SYS/FANBD1

* A fan module might not be present in this location for some configurations.

† A fan module might not be present in this location for some configurations.

‡ A fan module might not be present in this location for some configurations.

Internal Cables for Onboard SAS Controller Cards in SPARC Enterprise T5120 Servers

There are two SAS controller card options for the Sun SPARC Enterprise T5120 and T5220 servers (both options support RAID). The standard option uses the on-board SAS controller card preinstalled on every server. The second option is a StorageTek SAS RAID Internal Host Bus Adapter (HBA) PCIe card. The internal cabling of your server will be different depending on the SAS controller card option you choose.

FIGURE: Internal Cables for the Onboard SAS Controller Card (Four-Disk Capable Sun SPARC Enterprise T5120 Servers)

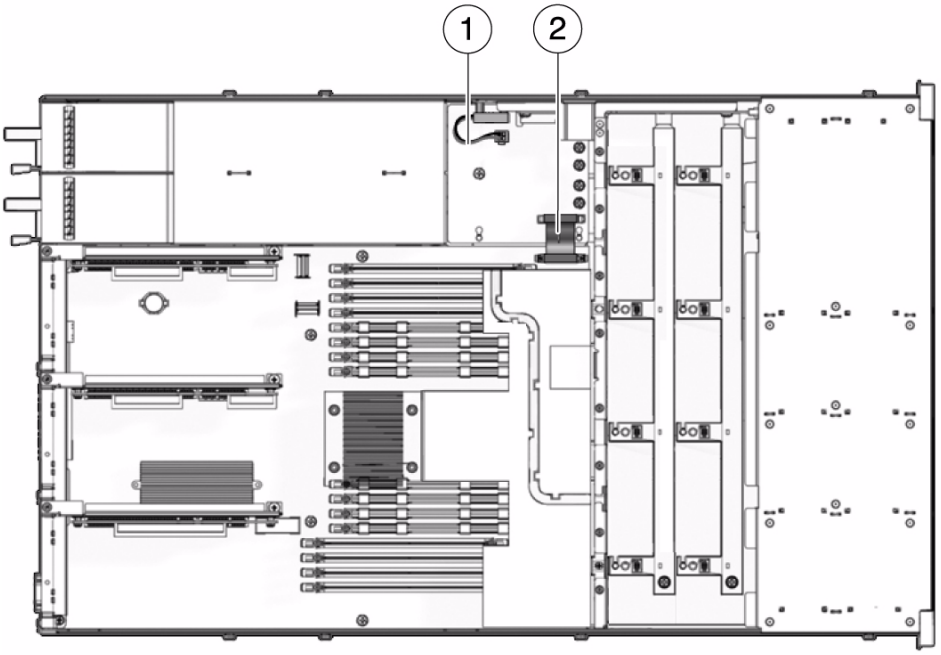


Figure Legend

1	Top cover interlock cable; connects to J0205 on the PDB
2	Motherboard to PDB ribbon; connects J0401 on the PDB to J5201 on the motherboard

FIGURE: HDD Cable from Onboard SAS to HDD Backplane (4-Disk Capable Sun SPARC Enterprise T5120 Server)

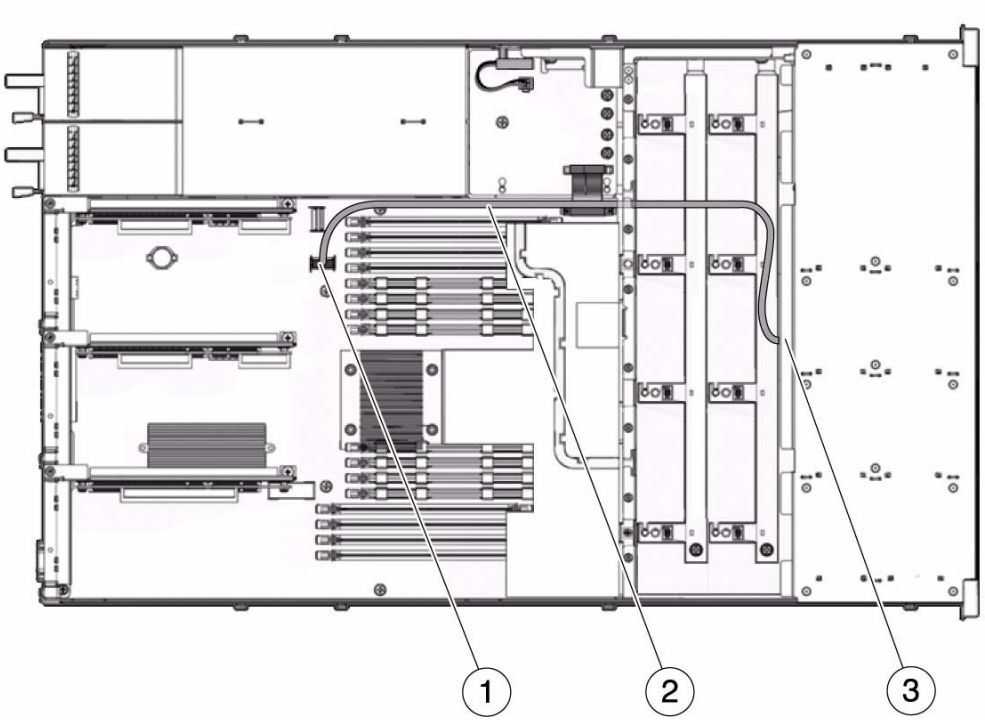


Figure Legend

1	Connector on the motherboard.
2	Hard drive data cable; connects J6401 on the motherboard to J0301 on the hard drive backplane Note - Do not route this cable over the air duct. Instead route it next to the air duct.
3	Connector on hard drive backplane

FIGURE: Internal Cables for the Onboard SAS Controller Card (Eight-Disk Capable Sun SPARC Enterprise T5120 Servers)

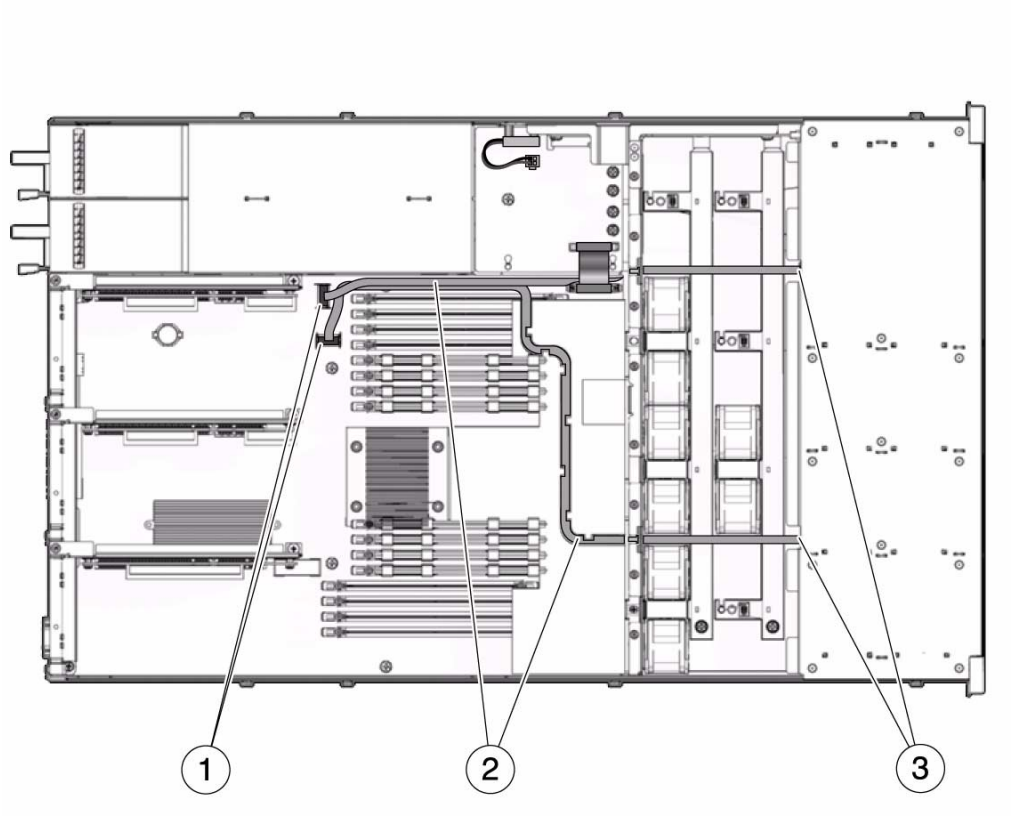


Figure Legend

1	Connectors on motherboard
2	Hard drive data cables: - The short cable connects to the motherboard J6402 connector and to J0302 connector on the hard drive backplane. Do not route this cable over the air duct. Instead, route it alongside the air duct - The longer cable connects to the motherboard J6401 connector and to J0301 connector on the hard drive backplane. Route this cable through the channel on the air duct and above the fan modules. Note - Use care in routing the short cable so it does not become caught between the PSU and the top cover.
3	Connectors on hard drive backplane

HDD Data Cable Routing for SAS RAID Controller Cards in Four-Disk Capable SPARC Enterprise T5120 Servers

There are two SAS controller card options for the Sun SPARC Enterprise T5120 and T5220 servers (both options support RAID). The standard option uses the on-board SAS controller card preinstalled on every server. The second option is a StorageTek SAS RAID Internal Host Bus Adapter (HBA) PCIe card. The internal cabling of your server will be different depending on the SAS controller card option you choose.

FIGURE: Hard Drive Data Cable Routing for SAS RAID Controller Card in Four-Disk Capable Sun SPARC Enterprise T5120 Servers

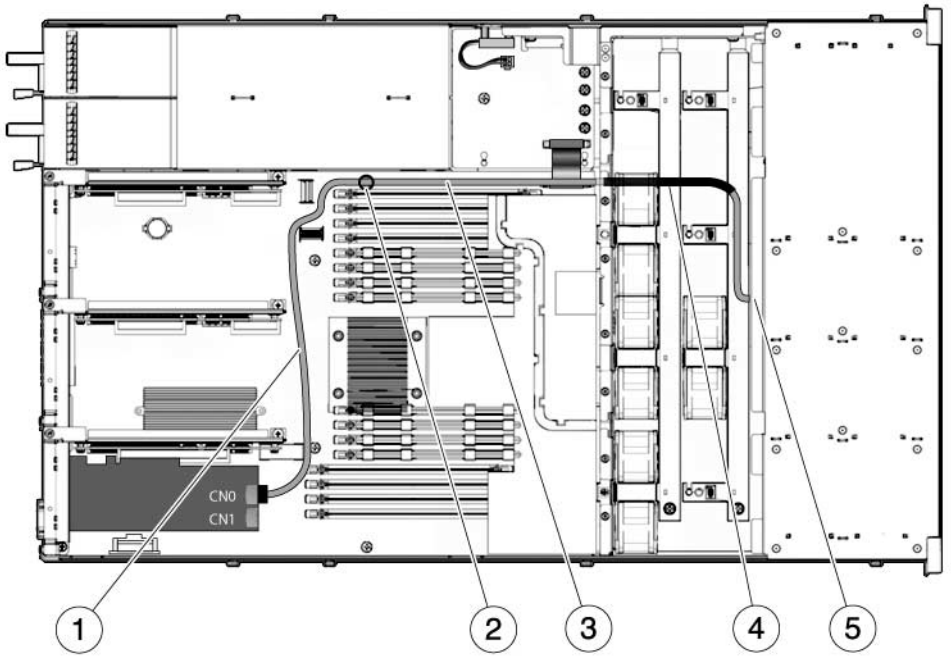


Figure Legend

1	Route the cable between the PCIe slots and FB-DIMMs
2	Route the cable through the cable retainer
3	Route the cable along the power supply midwall
4	Proper location of heat-shrink tubing
5	Route the cable through the fan midwall to the hard drive backplane

Note – For information about installing PCIe HBA cards, refer to the document, *Installing the StorageTek SAS RAID HBA Into the SPARC Enterprise T5120 and T5220 Servers*.

HDD Data Cable Routing for SAS RAID Controller Cards in Eight-Disk Capable SPARC Enterprise T5120 Servers

There are two SAS controller card options for the Sun SPARC Enterprise T5120 and T5220 servers (both options support RAID). The standard option uses the on-board SAS controller card preinstalled on every server. The second option is a StorageTek SAS RAID Internal Host Bus Adapter (HBA) PCIe card. The internal cabling of your server will be different depending on the SAS controller card option you choose.

FIGURE: Hard Drive Data Cable Routing for SAS RAID Controller Card in Eight-Disk Capable Sun SPARC Enterprise T5120 Servers

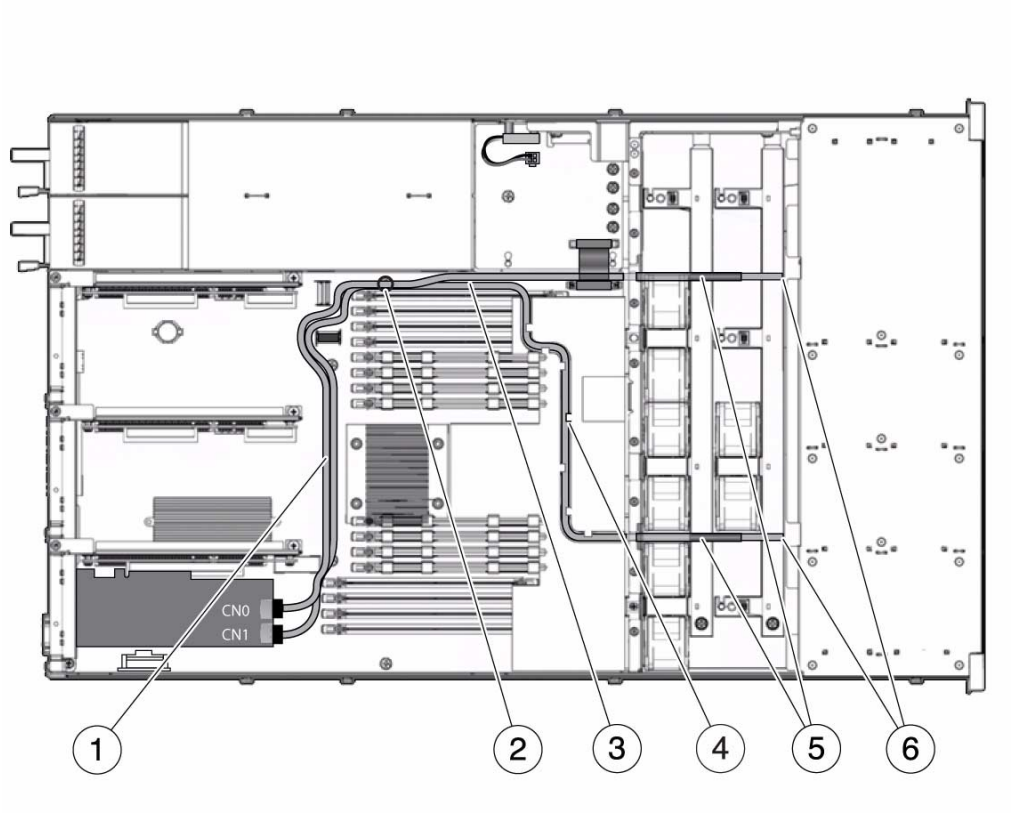


Figure Legend

1	Route the cable between the PCIe slots and FB-DIMMs
2	Route the cable through the cable retainer
3	Route the cable along the power supply midwall
4	78 cm cable routing through the channel on the clear plastic air duct
5	Proper positions of heat-shrink tubing
6	Route the cable through the fan midwall to the hard drive backplane

Note – For information about installing PCIe HBA cards, refer to the document, *Installing the StorageTek SAS RAID HBA Into the SPARC Enterprise T5120 and T5220 Servers*.

Identifying FRUs in Sun SPARC Enterprise T5220 Servers

These topics identify and illustrate Field Replaceable Units (FRUs) contained in Sun SPARC Enterprise T5220 servers.

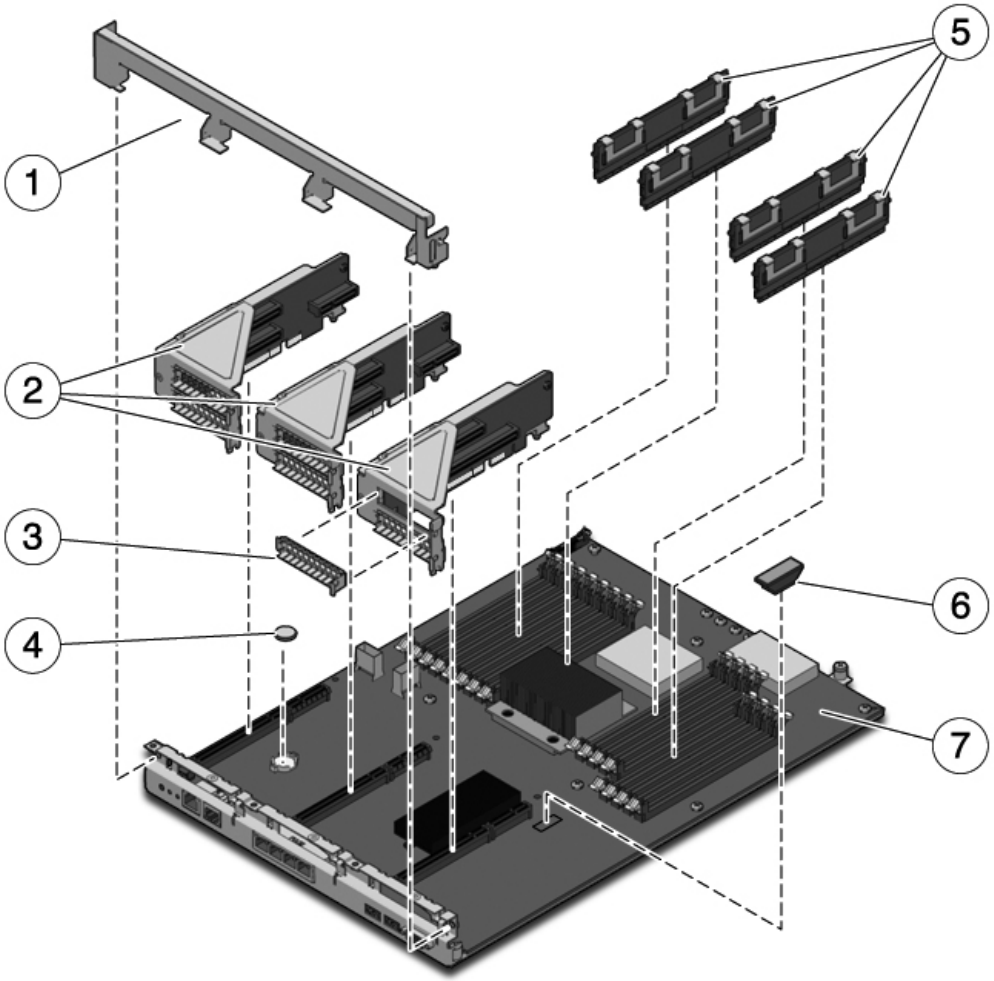
- "Motherboard Components in T5220 Servers" on page 196
- "I/O Components in Sun SPARC Enterprise T5220 Servers" on page 198
- "Power Distribution/Fan Module Components in Sun SPARC Enterprise T5220 Servers" on page 200
- "Internal Cables for Onboard SAS Controller Cards in Sun SPARC Enterprise T5220 Servers" on page 202
- "HDD Data Cable Routing for SAS RAID Controller Cards in Sun SPARC Enterprise T5220 Servers" on page 206

Related Information

- "Identifying FRUs in SPARC Enterprise T5120 Servers" on page 181

Motherboard Components in T5220 Servers

FIGURE: Motherboard Components in Sun SPARC Enterprise T5220 Servers



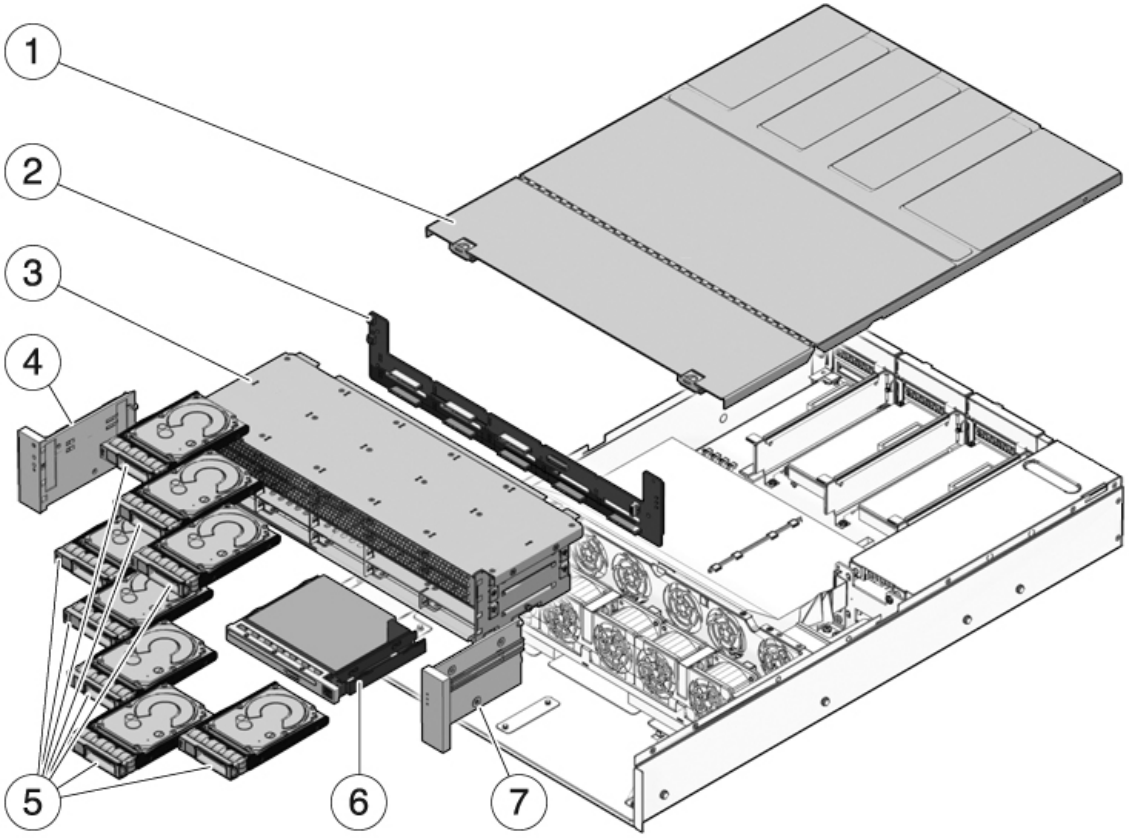
The following table identifies the components located on the motherboard and points to instructions for servicing them.

TABLE: Motherboard Components (SPARC Enterprise T5220 Servers)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Removable back panel cross beam	"Servicing PCIe/XAUI Risers" on page 102	Remove this to service PCIe/XAUI risers and cards.	N/A
2	PCIe/XAUI risers	"Servicing PCIe/XAUI Risers" on page 102	Back panel PCI cross beam must be removed to access risers.	/SYS/MB/RISER0 /SYS/MB/RISER1 /SYS/MB/RISER2
3	PCIe filler panel	"Servicing PCIe/XAUI Risers" on page 102	Must be installed in blank PCI slots.	N/A
4	Battery	"Servicing the Battery" on page 112	Necessary for system clock and other functions.	/SYS/MB/V_VBAT
5	FB-DIMMs	"Identify Faulty FB-DIMMs Using the `show faulty` Command" on page 83 "Identify Faulty FB-DIMMs Using the FB-DIMM Fault Locator Button" on page 83	See configuration rules before upgrading FB-DIMMs.	See "FB-DIMM Configuration Guidelines" on page 95
6	SCC module	"Servicing the SCC Module" on page 114	Contains host ID, MAC addresses, and service processor configuration data.	/SYS/MB/SC/SCC_NVRAM
7	Motherboard assembly	"Servicing the Motherboard Assembly" on page 117	Must be removed to access power distribution board, power supply backplane, and paddle card.	/SYS/MB

I/O Components in Sun SPARC Enterprise T5220 Servers

FIGURE: I/O Components (SPARC Enterprise T5220 Servers)



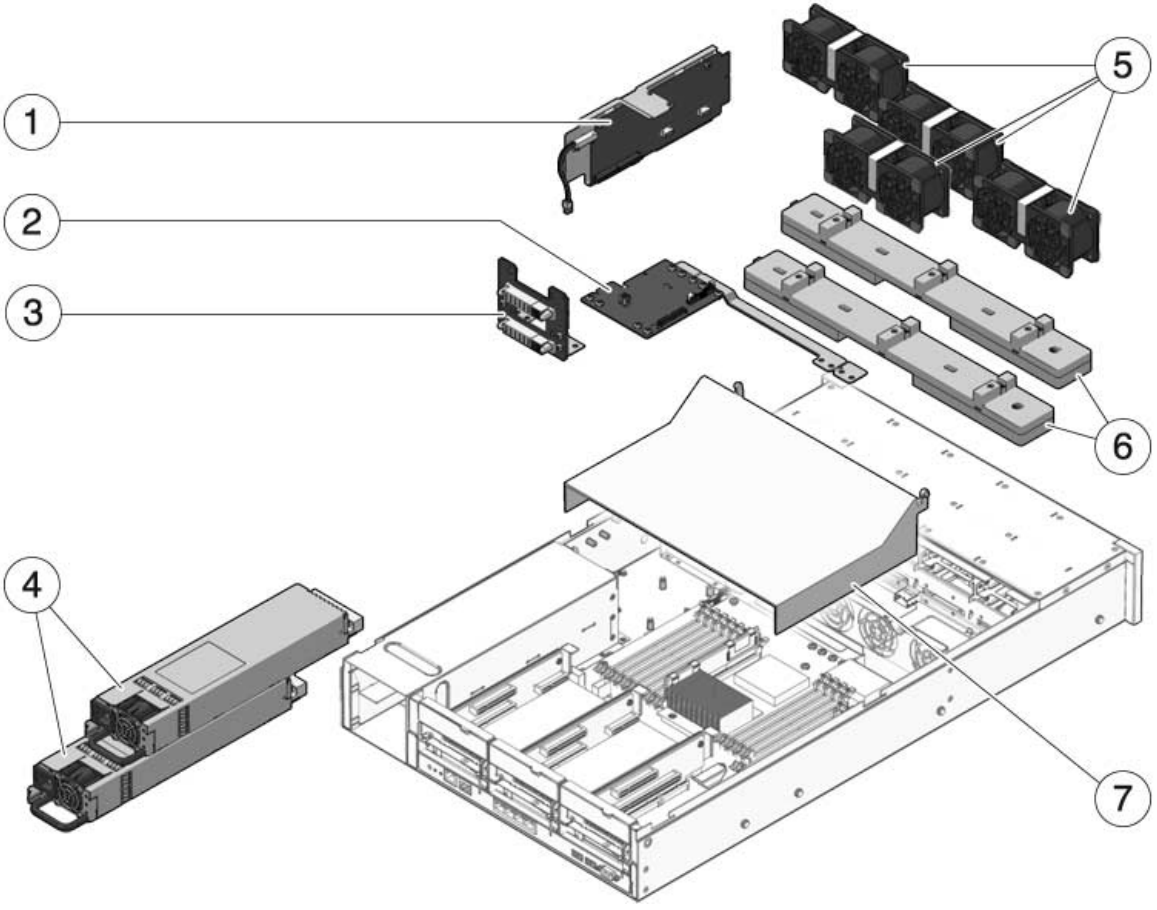
The following table identifies the I/O components in the server and points to instructions for servicing them.

TABLE: I/O Components (SPARC Enterprise T5220 Servers)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Top cover	"Remove the Top Cover" on page 67 "Install the Top Cover" on page 175	Removing top cover if the system is running will result in immediate shutdown.	N/A
2	Hard drive backplane	"Servicing the Hard Drive Cage" on page 146		/SYS/SASBP
3	Hard drive cage	"Servicing the Hard Drive Backplane" on page 152	Must be removed to service hard drive backplane and front control panel light pipes.	N/A
4	Left control panel light pipe assembly	"Servicing Front Control Panel Light Pipe Assemblies" on page 156	Metal light pipe bracket is not a FRU.	N/A
5	Hard drives	"Servicing Hard Drives" on page 69	Hard drives must be removed to service the hard drive backplane.	See "Eight-Drive Capable Backplane Configuration Reference" on page 78 or "Sixteen-Drive Capable Backplane Configuration Reference" on page 79
6	DVD/USB module	"Servicing DVD/USB Modules" on page 138	Must be removed to service the hard drive backplane.	/SYS/DVD /SYS/USBBD
7	Right control panel light pipe assembly	"Servicing Front Control Panel Light Pipe Assemblies" on page 156	Metal light pipe bracket is not a FRU.	N/A

Power Distribution/Fan Module Components in Sun SPARC Enterprise T5220 Servers

FIGURE: Power Distribution/Fan Module Components (SPARC Enterprise T5220 Servers)



The following table identifies the power distribution and fan module components in the server and points to instructions for servicing them.

TABLE: Power Distribution/Fan Module Components (SPARC Enterprise T5220 Servers)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Paddle card	"Servicing Paddle Cards" on page 171	Includes the top cover interlock switch.	/SYS/CONNBD
2	Power distribution board/bus bar	"Servicing Power Distribution Boards" on page 160	Bus bar is attached to the PDB with four screws. If replacing a defective PDB, you must move the bus bar to the new board and program the chassis serial number.	/SYS/PDB
3	Power supply backplane	"Servicing Power Supply Backplanes (Sun SPARC Enterprise T5220 Servers)" on page 167"Servicing Power Supply Backplanes (SPARC Enterprise T5220 Servers)" on page 167	This part is bundled with the power distribution board.	N/A
4	Power supplies	"Servicing Power Supplies" on page 129	Two power supplies provide N+1 redundancy.	/SYS/PS0 /SYS/PS1
5	Fan modules	"Servicing Fan Modules" on page 123	At least five fan modules must be installed in the server.	/SYS/FANBD0/FM0 /SYS/FANBD0/FM1 /SYS/FANBD0/FM2 /SYS/FANBD1/FM1*
6	Fan power boards	"Servicing Fan Power Boards" on page 143	Must be removed to service the paddle card.	/SYS/FANBD0 /SYS/FANBD1
7	Air duct	"Remove the Air Duct" on page 100 "Install the Air Duct" on page 101	Must be installed to provide proper cooling to the system.	N/A

* A fan module might not be present in this slot for some configurations.

Internal Cables for Onboard SAS Controller Cards in Sun SPARC Enterprise T5220 Servers

There are two SAS controller card options for the Sun SPARC Enterprise T5120 and T5220 servers (both options support RAID). The standard option uses the on-board SAS controller card preinstalled on every server. The second option is a StorageTek SAS RAID Internal Host Bus Adapter (HBA) PCIe card. The internal cabling of your server will be different depending on the SAS controller card option you choose.

FIGURE: Internal Cables for Onboard SAS Controller Cards (Eight-Disk Capable Sun SPARC Enterprise T5220 Servers)

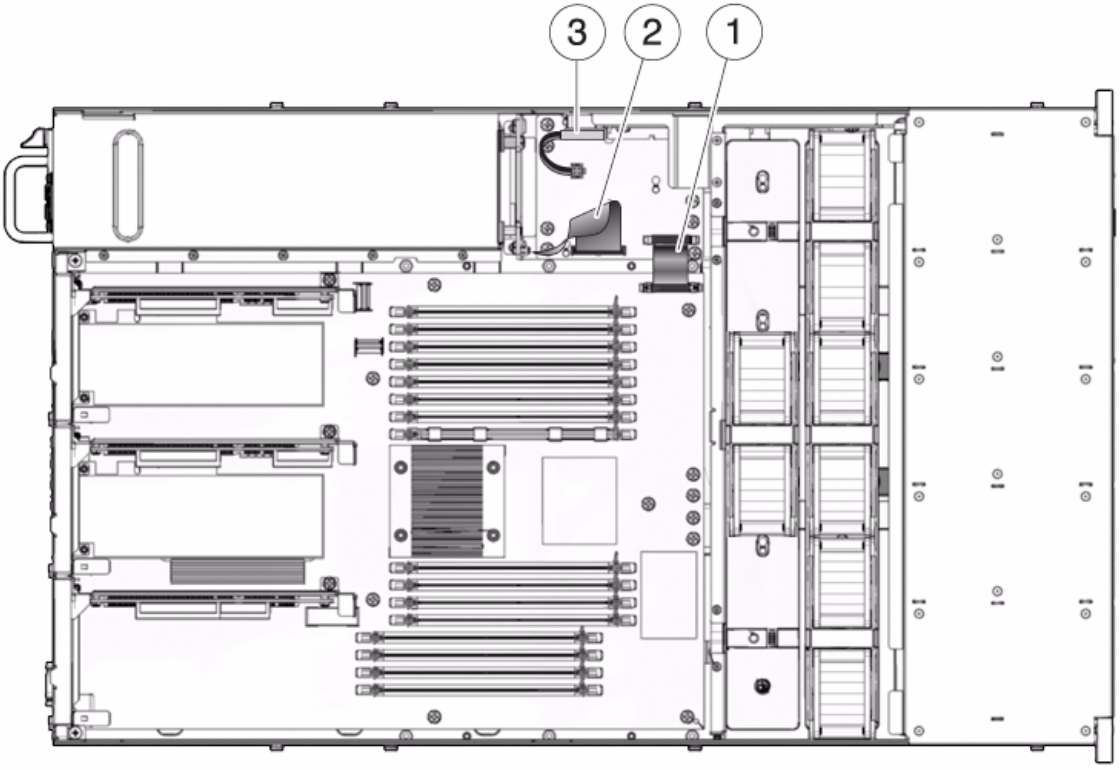


Figure Legend

1	Motherboard to PDB ribbon cable; connects J0403 on the PDB to J5201 on the motherboard
2	PDB to PSU backplane cable; connects J0103 on the PSU backplane to J0101 on the PDB.
3	Top cover interlock cable; connects to J0205 on the PDB

FIGURE: Internal Cables for the Onboard SAS Controller Card (Eight-Disk Capable Sun SPARC Enterprise T5220 Servers)

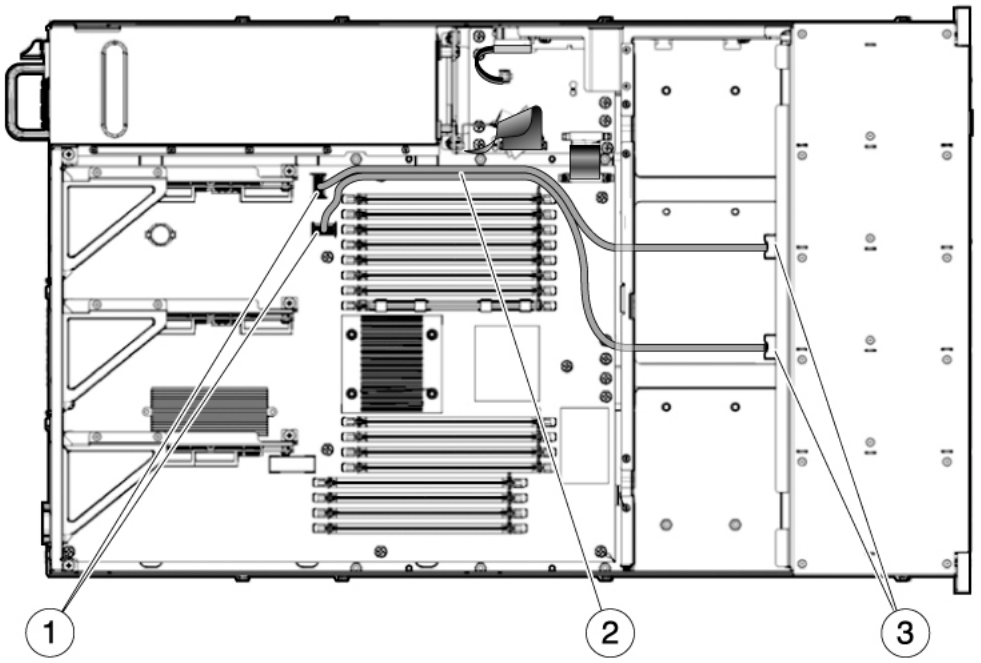


Figure Legend

1	Connectors on motherboard
2	Hard drive data cables: - The short cable connects to J6402 on the motherboard and to J0302 on the hard drive backplane. - The longer cable connects to J6401 on the motherboard and to J0301 on the hard drive backplane. Note - Both cables are routed around the air duct, under the chassis center wall and under the fan power boards.
3	Connectors on hard drive backplane

FIGURE: Internal Cables for Onboard SAS Controller Cards (Sixteen-Disk Capable Sun SPARC Enterprise T5220 Servers)

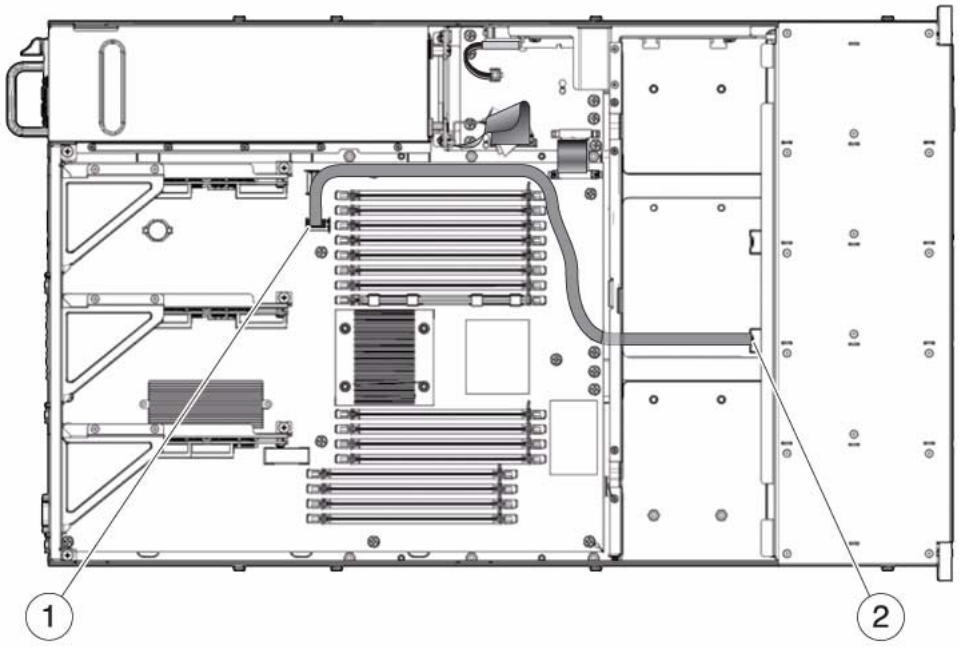


Figure Legend

1	SAS Connector on motherboard
2	Hard drive data cable; connects J6401 on the motherboard to J0301 on the hard drive backplane Note - The cable is routed around the air duct, under the chassis center wall and under the fan power boards.
3	Connector on hard drive backplane

HDD Data Cable Routing for SAS RAID Controller Cards in Sun SPARC Enterprise T5220 Servers

There are two SAS controller card options for the Sun SPARC Enterprise T5120 and T5220 servers (both options support RAID). The standard option uses the on-board SAS controller card preinstalled on every server. The second option is a StorageTek SAS RAID Internal Host Bus Adapter (HBA) PCIe card. The internal cabling of your server will be different depending on the SAS controller card option you choose.

FIGURE: HDD Data Cable Routing for SAS RAID Controller Cards in Eight- or Sixteen-Disk Capable Sun SPARC Enterprise T5220 Servers

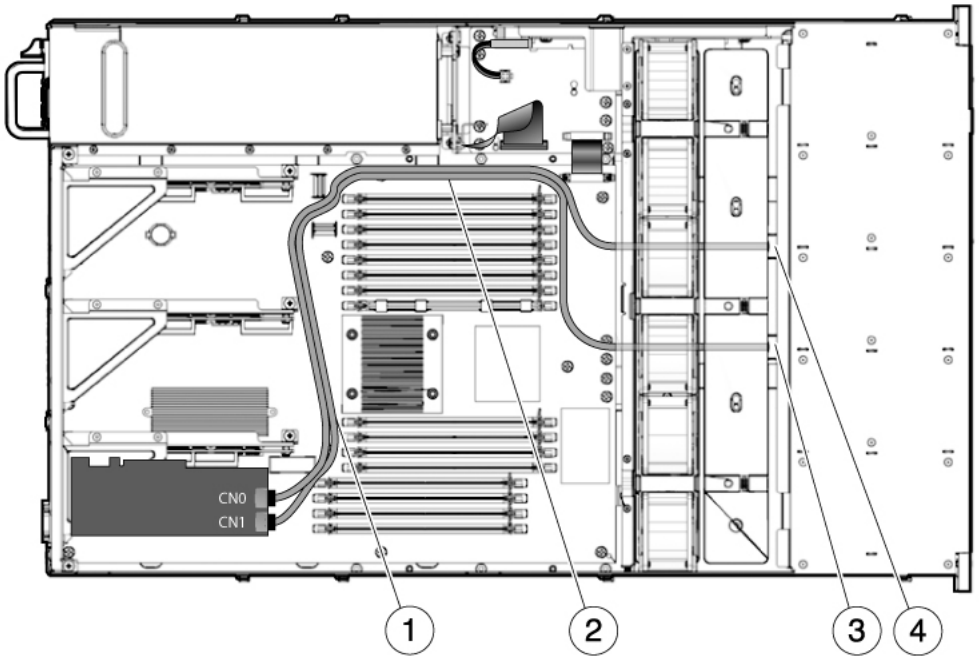


Figure Legend

1	Route both cables between the PCIe slots and FB-DIMMs
2	Route both cables along the power supply midwall
3	Route the 530-4119 cable under the fan midwall and fan boards, to the hard drive backplane
4	Route the 530-3892 cable under the fan midwall and fan boards, to the hard drive backplane

Note – For information about installing the PCIe HBA card, refer to the document, *Installing the StorageTek SAS RAID HBA Into the SPARC Enterprise T5120 and T5220 Servers*.

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